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PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

Established 1886

Happy New Year

. . . . And so we begin another year—our fifty-third business year, inspired in 1939, as in 1886, by a constant purpose to make our service a constructive factor in the unceasing development of the Pulp and Paper Industry.

We look forward to many more years of useful service to old friends and new.

GOTTESMAN & COMPANY

—INCORPORATED—

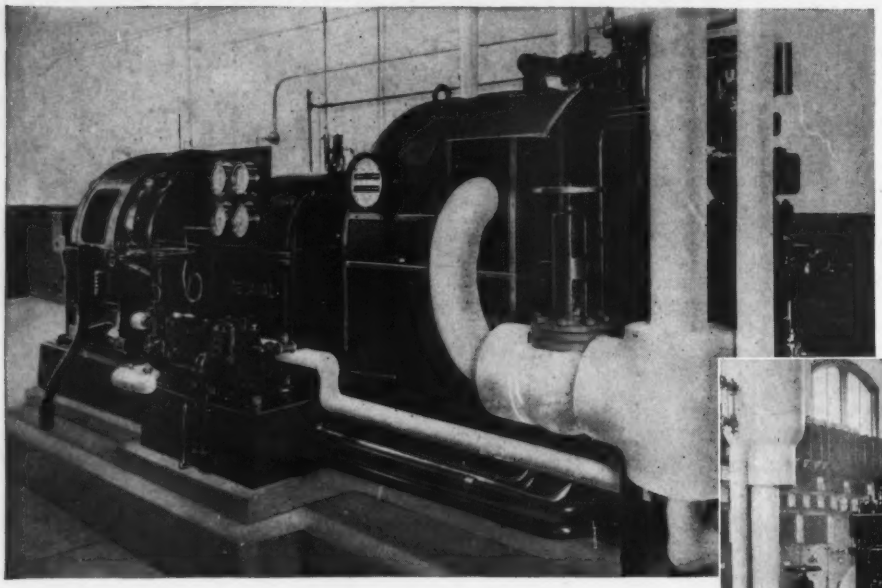
WOOD PULP

22 EAST 40th STREET NEW YORK, N. Y.

EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

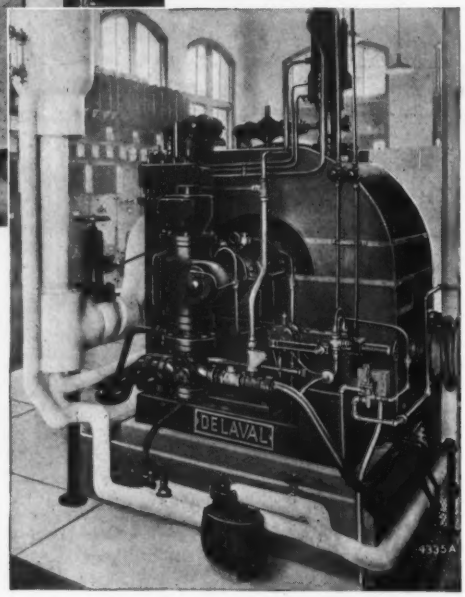
JAN. 5 1939

Vol. CVIII No. 1



● De Laval geared turbine driving 200 kw. generator.

● Turbine governing devices by which turbine output is controlled in accordance with requirements for heating steam.



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E. Eng.

PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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PAPER TRADE JOURNAL

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SIXTY-EIGHTH YEAR

PAPER

PAPER

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with Paper Trade Journal.

Vol. CVIII, No. 1 Thursday, January 5, 1939

Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with Paper Trade Journal.

Manufacturers See More Normal Year Ahead

George Mead of Consolidated Power & Paper and John Alexander of Nekoosa-Edwards Co. Comment On Business Prospects—Grandfather Falls Power Plant Dedicated—Issue Conservation Report On Pulpwood.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 3, 1939.—Optimism more of the expectant and hopeful type rather than the positive prevails among some of the Wisconsin mills as the new year opens. Statements by George W. Mead, president of the Consolidated Water Power and Paper Company, Wisconsin Rapids, and John E. Alexander, president of the Nekoosa-Edwards Paper Company, Nekoosa and Port Edwards, are typical.

Mr. Mead says: "Business progress has been slow. In some lines of industry there has been a moderate advancement, however in most classes of manufacture there is little tangible evidence of imminent prosperity.

"In our plants we have not shut down very much of the time; in fact, we have managed to keep a large number of men busy at a substantial scale of wages. At the Wisconsin Rapids division, due to the large additions to buildings and machinery, we have taken on approximately 180 more employees.

"Despite good operating schedules there has been only a small return in the form of profits to those whose money is invested in our company. Prices are at a very low ebb and there is no sign of immediate improvement. Foreign and west coast pulp is being dumped into the middle western territory at very low prices, which has increased competitive bidding for all paper contracts.

"The proposed Eau Pleine reservoir and the Wisconsin river development would have provided a stimulus to local business, however the entire program is now held in abeyance.

"We are still in a period of uncertainty. Business experts are sending out the word that there will be a slow and gradual improvement during the next twelve months. They assure us we are definitely rising from the depression. Men engaged in the paper industry continue to be expectant and hopeful."

Consolidated increased its production considerably during the last year due to expansion of its properties at Wisconsin Rapids and the addition of No. 5 machine, and the erection of coater equipment on one of its machines at the Biron, Wis., mill.

John E. Alexander on Business Conditions

Mr. Alexander commented on the situation as follows: "Now that the year 1938 has drawn to a close, most industries, in taking inventories of their operations, are recognizing that this last year has been critical, with many obstacles and handicaps to overcome and cope with. The picture has been fraught with nation-wide political issues, labor strife, overburdening taxation measures and many other factors too numerous to mention, all of which, to some degree or other, have had a tendency to impede industrial progress.

"Yet in the face of all these things the mills operating in this vicinity, by comparison with other sections of the country, have been fortunate in providing their employees with steady work. The Nekoosa-Edwards Paper Company has, as an average figure, operated its plants at 85 per cent capacity throughout the year.

"Despite the fact it must be recognized that market prices have been at a low ebb throughout this year, NEPCO has gone ahead, in addition to its wrapping and converting lines, with greater intensity on its fine paper program. Many new improvements in the way of buildings, machinery and equipment have been added during the year which will be further reflected in NEPCO's ability to make quality products. Likewise, a greater number of men have been added to our sales and manufacturing personnel, as well as the actual employment of more people in the mills proper. So we are going forward into 1939 proud of our mill and proud of our paper coming from a mill of outstanding achievement.

"Business is getting its feet on the ground. Optimism is contagious and soon all business will respond. Nineteen thirty-nine will be a more rational year than 1937 or 1938. Paper mill management is awake and I firmly believe prices will be uniformly firmer and the general law of supply and demand will take effect."

Grandfather Falls Plant Dedicated

Dedication of the Wisconsin Public Service Corporation's new $1,700,000 hydro-electric plant at Grandfather Falls, near Merrill, Wis., was scheduled Wednesday, January 4, according to J. P. Pulliam, president. A new dam and hydro-electric plant were constructed at the site of the former Grandfather Falls Paper Company. Operation of the plant will mean greatly increased power supply for mills along the Wisconsin River.

(Continued on page 27)

Ontario Mills to Watch Production This Year

Newsprint Producers Expect Improvement In Industry But Will Guard Against Overproduction — Great Lakes Proration Contract Decided — Maurice Neilson Appointed Manager of Don Valley Mill—Other News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., January 3, 1939.—Producers of newsprint and other lines of paper are entering upon a new year in a fairly cheerful mood, confident in the belief that the coming twelve months will result in improved business. Fundamentally, the industry is in a sound position and many disturbing factors, which loomed up during 1938, have been removed for the present in the way of tariff revisions, the war situation abroad and the recession which prevailed during the greater part of 1938. Caution will, however, govern all movements, overproduction will be guarded against and expenditures carefully watched. During the past week many mills shut down for repairs and overhauling and have been put in fine shape for production during 1939. No one cares to hazard a definite opinion as to the outlook but it is felt that no more reductions in price will be made and that the trend will be upward. While leaders in many other lines of industrial activity have come forward and given their views on the outlook for the coming twelve months, newsprint producers are backward in advancing any forecasts. On the whole business in all lines of paper, both with manufacturers and jobbers was in 1938 on about a level with that of 1936, while 1937 was a year of encouragement and increased profits and volume with most organizations.

Great Lakes Proration Contract Confirmed

Hon. Peter Heenan, Minister of Lands and Forests for Ontario, and Hon. Earl Rowe, the new president of the Great Lakes Paper Company, Port Arthur, Ont., have confirmed the report that proration managers have decided to permit the contract for 20,000 tons of newsprint with the Journal of Milwaukee, Wis., to remain with the Great Lakes Paper Company. For 1939 however, the tonnage involved must be re-allocated to other mills, and is effective for one year only. The re-allocation which precipitated a dispute between the Great Lakes Company, the Ontario government and the rest of the industry, is solved for the present, and this is considered significant so far as the Great Lakes Company is concerned. An official of the latter said that it simply meant that while they had to give up the Milwaukee tonnage for a year, the contract remains in the Great Lakes family. The contract covers a period of eight years and is along the line of other contracts of Great Lakes basis of division of any possible dividends of Class "B" shares of Great Lakes remaining the same. The Milwaukee tonnage had been under contract to Abitibi Power & Paper Company and expired at the end of 1938. When the former president of the Great Lakes Co., Mr. C. H. Carlisle, obtained the business for his company, the Ontario government intervened on the grounds that the ratio of the company's operations to capacity was already considerably in excess of the rate of capacity of other newsprint mills. The new arrangement has been the result of negotiations between Mr. Rowe and the Ontario government. At the end of 1939, distribution of the Milwaukee business will again be the subject of negotiations.

Camp Caterers Seek to Collect Wages

Failing to collect $33,102.42 wages said to be due to employees of Crawley & McCracken Company, Limited, camp caterers, from the Lake Sulphite Pulp Company, Red Rock, Ont., by the judgment given by the court to a Toronto firm of solicitors, acting for the plaintiff company, has issued a writ against seven directors of the company who, it is alleged by the legal firm, are liable for the wages. A duplicate of the writ has been sent to Montreal. The directors against whom the Crawley & McCracken Company are proceeding are R. O. Sweezy, Montreal, promoter and president of the Lake Sulphite Company, John Stadler, Montreal, F. M. Connel, Toronto, Gordon C. Leitch, Toronto, J. A. Simard, Montreal, John W. McColl, Toronto, and J. H. Ratcliffe, Toronto.

R. J. Askin Heads Kiwanis Club

Robert J. Askin, manager of the Thunder Bay Paper Company, Limited, Port Arthur, Ont., a subsidiary of the Abitibi Power and Paper Company, Limited, for the past four years, has been elected president of the Port Arthur—Fort William Kiwanis Club. He is on the Board of Governors of the Port Arthur General Hospital and a Councillor for the Lakehead Branch of the Engineering Institute of Canada.

M. O. Neilson Appointed Mill Manager

Maurice O. Neilson, widely known chemical engineer and consultant, has been appointed superintendent and mill manager of the Don Valley Paper Company, Limited, Toronto, who are producers of medium weight paper specialties and has entered upon his new duties. Mr. Neilson was formerly with Belgo-Canadian Paper Company and J. R. Booth, Limited.

Hon. F. C. Biggs, Dundas, Ont., who was at one time Minister of Highways for Ontario, has been elected president of the Consolidated Sales Book and Wax Paper Company, Limited, Hamilton. He was one of the original incorporators of the company and held the position of vice president for fourteen years. Mr. Briggs is a director of several other companies in the life insurance and clothing line.

Paper Box Demand Good on Holidays

Paper box manufacturers report a large holiday business, particularly in the specialty line and the great increase in Yuletide boxes for enclosing parcels. Hosiery is a new development and manufacturers turned out fancy boxes or containers with a capacity from three to a dozen pairs. Attractive containers were also more largely used than ever for towels, wash cloths and other gifts in that line. Many other ranges of goods were enclosed in colored holiday boxes for the first time and during the coming year more manufacturers will develop specialties

Chicago Optimistic of Paper Trade in 1939

With Sales Volume of Some Grades of Paper Now On Uptrend, Chicago Merchants Coordinate Sales Promotion Plans—Retail Merchants Protest "Wholesale" Policy—Paper Division of Chicago Community Fund Drive.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 3, 1939—While the quietness prevailing between the two major holidays of the year characterizes the Chicago paper market, there persists a feeling of genuine optimism over what is to happen in 1939. Certain lines are experiencing an upturn in tonnage requirements but most lines are beginning even now to coordinate their plans for a special emphasis on sales promotion during the next few months. All grades of paper seem to share in the optimism and the only grades that give indications of leaving the New Year in an unsatisfactory way are the waste grades where the market is definitely soft. Krafts changed little during the holiday season with business itself described as good but the price situation reported as still unsatisfactory. Book and cover papers were exhibiting an even trend with the outlook considered fair for the first quarter. Bonds and ledgers were more active as the tendency toward inventory replenishment was already in evidence. Groundwoods remained about the same as did newsprints, both looking forward to genuine improvement in 1939.

Midwest S.A.P.I. Hold Annual Party

Members and guests of the Salesmens Association of the Paper Industry, midwest division, are still talking about the Christmas party held at the Hotel Sherman, Chicago, on December 28. About 100 salesmen and guests were in attendance at the noon luncheon event for which arrangements were made by the perennial Christmas party chairman, Ben Babbitt of the Brown Company. Mr. Babbitt also served as toastmaster in his usual effective style. The entertainment was of a varied character with a part of the popular Hotel Sherman floor show providing a number of features. The old stand-by two-piano novelty which has been a big hit at previous Salesmen's parties again made its appearance with Harold Pfister of Bradner Smith & Company combining with Harry Kerr, Chicago insurance broker for an afternoon of entertainment. In addition, a roller skating act was on exhibit for the edification of the members and guests while the mysterious performances of a magician and some vocal numbers by a featured lady star also entertained the group. The only really disappointing feature of the afternoon was the absence of Jim Coy, executive of the Flambeau Paper Company. Because of unforeseen business complications, Jim couldn't be present to lead the singing and though the reliable Frank Prentiss endeavored to pinch hit even he admitted he wasn't up to Jim's now famous standard.

Retailers Protest "Wholesale" Policy

Retail merchants in the State of Illinois, and particularly in the central territory, are reporting much concern over the procedure of paper concerns in offering a wide variety of merchandise to customers on a wholesale basis. The Illinois Retail Hardware Association, in particular, is disturbed over bulletins recently issued by a central Illinois wholesale paper house. The bulletins, sent to customers of the paper house, offer standard merchandise featured in hardware stores at appreciable savings. Merchants feel that this is unfair competition and that if carried on to any appreciable extent would eventually have much to do with the breaking down of the system of distribution as practiced today. Particularly, are the hardware and furniture retailers of the opinion that the paper houses in question are "shortsighted" because they "overlook the fact that they, too, are dependent upon retailing for the ultimate sales of a large part of their output and cannot expect retailing to remain loyal to them if they, in turn, endeavor to secure business by diverting it from regular retail channels even though it is considered a 'customer service'." The retail trade also feels that all business must do everything within its power to preserve the profit motive in business and to discourage anything that has a tendency to favor a certain class of buyers as compared to another. Thus, for specific trade reasons and because of their fear that a continuation of the practice is likely to react very unfavorably on the entire system of private enterprise, the retail trade is urging paper manufacturers, jobbers and converters to discontinue a procedure of "servicing customers" which is not particularly helpful to anyone and of real damage to many.

Chicago Community Fund Drive

The total goal for all industries in the Chicago Community Fund Drive is $3,550,000.00 while the quota set for the paper division, was placed at $26,000.00. The paper division is headed by Leo S. Altholz, secretary of the Inlander-Steindler Paper Company, and includes the following: Bags, cups and tags; folding box manufacturers; set-up box manufacturers; corrugated box manufacturers; coarse paper dealers; paper brokers; coarse paper manufacturers; envelope and tablet manufacturers; fine paper dealers; fine paper manufacturers; waste paper dealers."

The full $26,000.00 quota was filled on December 16, and additional subscriptions are still coming in. "We have set a new goal for ourselves of 110 per cent of the quota," Chairman Altholz said, "which we hope to reach shortly." The chairman has been ably assisted in the solicitation of contributions by the following co-chairmen: A. G. Shannon, International Tag & Salesbook Company; B. A. Weathers, Jr., Union Bag & Paper Corporation; H. S. Eckhouse, Central Bag and Burlap Company; A. G. Ballenberg, Morris Paper Mills; R. W. Darnell, W. C. Ritchie & Company; Allen Ripley, Atlas Box Company; W. E. Beier, Beier & Company; William Goldberg, Bateson & Company; John T. Burriss, Albemarle Paper Company; F. P. Schneider, Transo Envelope Company; John Ughetti, Dwight Bros. Paper Company; Courtney Reeves, Allied Paper Mills; and T. F. Woody, Pioneer Paper Stock Company.

Sales Study Course Features Talking Films

Program of Instruction On Salesmanship Conducted By Paper Trade Association of Philadelphia Opens January 17 At Franklin Institute — Ten Practical Selling Demonstrations Will Include Talking Motion Pictures.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 3, 1939.—Sell More —Earn More is the slogan of the Sales Study Course, which will be conducted by the Paper Trade Association of Philadelphia at the Franklin Institute, Parkway at 21st street. This course will consist of ten demonstrations, including talking pictures, which have been carefully arranged to help paper salesmen obtain more orders, and will be held on Tuesday evenings, at 7 p. m. on January 17th, January 31st, February 14th, February 28th, March 14th, March 28th, April 11th, April 25th, May 9th and May 23rd. Demonstration Number 1 will deal with the price problem, taking the ice out of price. It being generally conceded that every salesman in every selling field continually runs into that icy barrier where price freezes the sale. It is proposed by this demonstration to illustrate and consider the four principles used by winners to take the ice out of price, namely: melt it, with the heat of desire; crack it, with the sharp edge of comparison; dissolve it, with the salt of pride; smash it, by pounding it with profit. Each of the foregoing principles will be considered one at a time, and opportunity will be afforded the students to watch the winners make them work. Then Frank Vaughan, president of the Bay West Paper Company, and member of The Paper and Twine Club of Cincinnati, where he is chairman of The General Committee on Sales Training, will take the meeting over, applying to paper-selling the demonstration which has been witnessed on the screen, showing how the four important principles can be successfully applied to the all-important question of price.

Demonstration on Technique of Selling

Demonstration Number 2 is entitled Let George do it—Make Demonstrations sell. The object of this moving picture will be to portray the proper technique in making a demonstration *sell,* to harness the buy-it urge, carefully resisting that impulse to demonstrate one's self. Actual sales records of men who top their field in the art of making a demonstration will be discussed. A. Ellis Frampton, advertising manager and assistant general sales manager of Hammermill Paper Company, will explain how the principles shown on the screen can be applied to selling paper. From his own personal experience he will show how a "demonstration piece" should be properly and successfully demonstrated.

Demonstration on Closing Sales

Demonstration Number 3 will deal with How the top flight closers do it. The moving picture will depict the questions the champion closers on today's business Firing-Line use to clinch a close, proving that the question asked, when properly selected, can weigh heavily in the salesman's favor. Immediately following the picture, William Linderking, general sales manager of the Lily Cup Corp., will continue the meeting and discuss the intricacies of practical application of the properly selected question. Mr. Linderking, whose work in one of the industry's most competitive fields is outstanding, guides the activities of over 300 salesmen, and will impart to the class concrete examples of instances that have helped his men close orders.

Future Films and Demonstrations

There, of course, will be further demonstrations held on subsequent dates, but some idea of the splendid material being offered in this 1939 Course can be had from the foregoing. In addition, films entitled: How to use a theme song in selling; Pin your product to your prospect; Make your words wake up; Making your manners sell; Sales have pups; and Salesmanage yourself, will be shown.

To Be General Manager at Brunswick

SALEM, N. J., December 27, 1938—Edward J. Gayner, a native of Salem, was appointed vice president and general manager of the Brunswick Pulp and Paper Company at Brunswick, at a recent meeting of the Board of Directors of that company.

The Brunswick Pulp and Paper Company is jointly owned by The Mead Corporation and the Scott Paper Company.

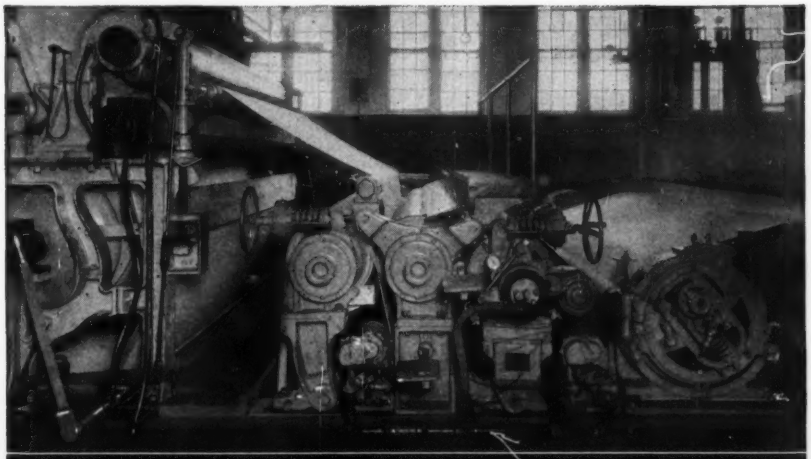
Mr. Gayner still retains his position as president of the Nova Scotia Wood Pulp and Paper Company, another Scott Paper Company subsidiary, and continues as a director of the Gayner Glass Works, one of Salem's principal industries which for several generations has been owned by the Gayner family.

He has also been elecetd president and director of Timberlands, Inc., a subsidiary of the Brunswick Pulp and Paper Company, which was organized as a Wood Procurement and Land Management Company for Brunswick County. He was also elected president and director of Lampadoshia Company, a subsidiary of Timberlands, Inc., on November 12, 1938. This is a land management and naval stores operating company.

Ed Gayner is a man of wide experience in plant and production supervision and possesses an intimate knowledge of the pulp and paper industry.

On graduating from Dickinson College in 1924, he went with the Scott Paper Company, starting as a third-hand on a paper machine. He has worked on many phases of the manufacture of paper and pulp. Not only has he worked on the paper machine, but he has also served in the beater room and finishing division.

After working up to a minor supervisory position in the paper mill, he was appointed manager of the Nova Scotia Wood Pulp and Paper Company and had complete charge of that operation from 1929 to 1933, being located at the plant, Charleston, Queens County, Nova Scotia.



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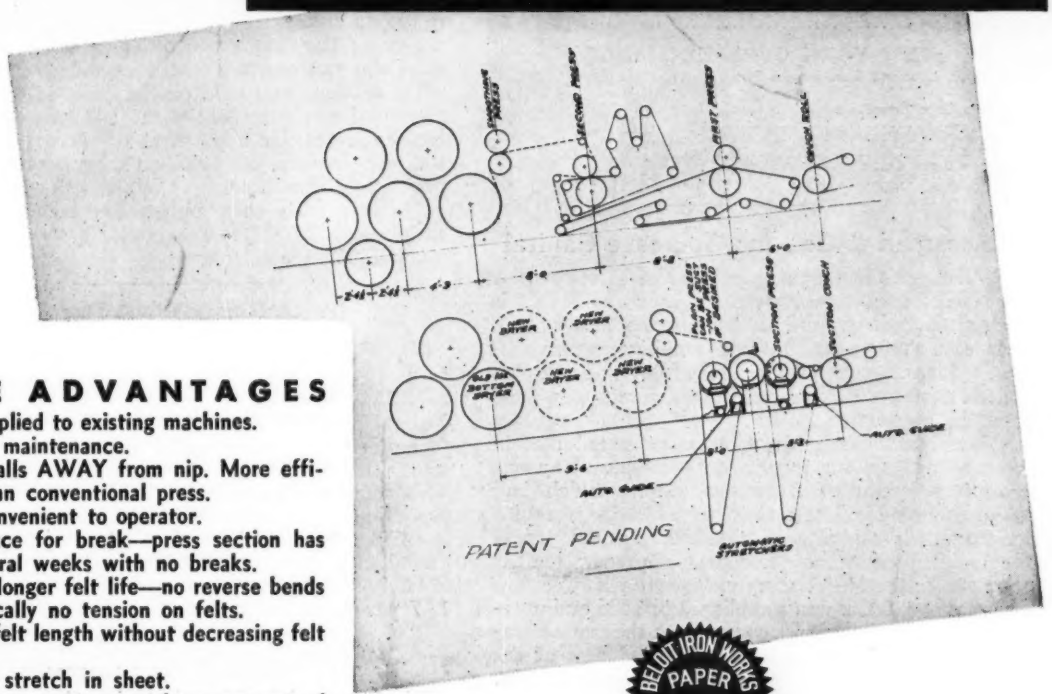

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7 Shorter felt length without decreasing felt life.
8 Reduces stretch in sheet.
9 Unnecessary to carry a large amount of crown.
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11 Saves enough space to permit use of more dryers, or to lengthen fourdrinier wire part.
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13 Smooths out sheet without need of reverse press.
14 Increases speed and safety.

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THE BELOIT WAY IS THE MODERN WAY

Financial News of Pulp and Paper Industry

Gottesman & Co. Increase Their Capital To Provide For Expansion Program In 1939—Union Bag Files Statement Covering New Stock Issue—Celotex Reports Net Profit—Peninsular Paper Company Pays Bonuses.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending January 4, 1939

	High	Low	Last
A. P. W.	2⅜	2⅛	2⅜
Armstrong Cork Co.	59⅝	56½	57¼
Celotex Corp.	19⅛	18¼	19
Certain-Teed Products Corp.	13	11⅝	12⅜
Certain-Teed Products Corp., pf.	47½	41½	47¼
Champion Paper & Fibre Co.	30½	29¼	29¼
Champion Paper & Fibre Co., pf.	105	101	101
Congoleum-Nairn Co.	30	29	30
Container Corp. of America	16½	15½	16⅜
Continental-Diamond Fibre Co.	10¼	8¾	10⅛
Crown-Zellerbach Co.	14⅜	13¾	14⅛
Crown-Zellerbach Co., pf.	87	86	86¼
Flintkote Co.	31⅜	29½	30⅜
Robert Gair	4⅛	3¾	3¾
Robert Gair, pf.	13¼	12	12½
International Paper & Power	14⅞	14⅛	14½
International Paper & Power, pf.	51¾	50	50⅝
Johns-Manville Corp.	106	103¾	104½
Johns-Manville Corp., pf.	130	129¾	130
Kimberly-Clark Corp.	27½	27½	27½
MacAndrews & Forbes	32½	30⅛	32
Masonite Corp.	57½	56	57¼
Mead Corp.	11¾	11	11⅜
Mead Corp., pf.	70	69	70
Paraffine Companies, Inc.	60½	58	60½
Ruberoid Co.	34	33	34
Scott Paper Co.	48½	48¼	48¼
Scott Paper Co., pf.	113	113	113
Sutherland Paper Co.	30	29⅝	30
Union Bag & Paper Corp.	12½	11¾	11⅝
United Paperboard Co.	7⅛	7	7
U. S. Gypsum Co.	113	109½	112

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending January 4, 1939

	High	Low	Last
American Box Board Co.	9	8¾	8¾
Brown Co., pf.	20½	18½	18½
Great Northern Paper	38½	38½	38½
St. Regis Paper Co.	3¼	2⅞	3⅛
St. Regis Paper Co., pf.	59	59	59
Taggart Corp.	5	4¾	5

Gottesman & Co., Inc. Increase Capital

D. Samuel Gottesman, president of Gottesman & Co., Inc., 22 East 40th street, New York, N. Y., is among the growing number of business leaders who feels that the outlook for the coming year is distinctly favorable to further expansion in industrial activity and looks for improvement in the pulp and paper business during 1939.

When interviewed, Mr. Gottesman stated that in order to provide for increased business and an expansion program of large proportions which had been planned for 1939, Gottesman & Co. were increasing their capital to $2,000,000. Formal papers for this purpose are now in course of preparation for filing under the N. Y. stock corporation law.

Gottesman & Co. was established in 1886 and numbers among its important connections the representation of many of the foremost pulp producers of the United States, Scandinavia and Continental Europe.

Union Bag Files a Stock Issue

The Union Bag and Paper Corporation last week filed a registration statement with the securities and exchange commission in Washington covering 210,455 shares of capital stock without par value. E. H. Rollins Sons, Inc., and Blyth & Co., Inc., are named as principal underwriters of the new issue.

At the same time it was announced that the company also proposes to issue 4½ per cent serial promissory notes in the principal amount of $4,600,000 under agreement with the Metropolitan Life Insurance Company and the Prudential Life Insurance Company of America, who will buy the notes.

On the registration becoming effective, the new stock is expected to be offered to stockholders of the company of record about January 21, at the rate of one share of new stock for each five shares of the company's present stock held. Subscription rights, evidenced by transferable subscription certificates, will then expire about February 4, 1939.

Net proceeds of the sales of the new stock together with the proceeds of the sale of the notes will be used to retire all the company's presently outstanding indebtedness with the exception of a small amount of purchase money mortgages on southern timberlands.

Peninsular Paper Co. Pays Bonus

YPSILANTE, Mich., December 30, 1938—The Peninsular Paper Company issued earned bonus checks to employes amounting to approximately $2,000.

During the first six months of the present year sales did not warrant extra payment, as last year when a bonus was paid on the basis of $2 for each month of employment, but the last half of the year has made possible a payment of more than for the last six months of 1937. The payment for this period has been fixed at $1.50 per month.

On this basis each employee received $1.50 for each month of employment during this year, or a total of $18 for 12 months.

Celotex Earns $1.19 Per Share

The Celotex Corporation for the fiscal year ended October 31, 1938, reports consolidated net profit of $518,358 after all charges including provision for Federal income taxes. This is equivalent, after preferred dividends paid, to $1.19 a share on the 312,427 shares of common stock outstanding October 31. This compares with net profit of $1,266,753 for the preceding fiscal year, equivalent on the same basis to $3.58 a common share. Net sales for the 12-month period amounted to $9,126,488, against sales of $10,574,242 for the preceding fiscal year, a decrease of 13.7 per cent.

Wortendyke Golden Anniversary

The Wortendyke Manufacturing Company, manufacturer of paper products, Richmond, Va., is this year celebrating its golden anniversary, marking what the company states it likes to refer to as "fifty years of service that satisfies."

During this entire period, the company has benefited by the wise counsel and high ideals of its senior vice-president and treasurer, L. G. Chelf, and happily the passing years have dealt kindly with him so that he continues daily at his post, taking an active interest in company affairs.

Paper Festival Program

The general program for the first annual Southern Paper Festival at Savannah, Ga., April 16-19 inclusive, has been arranged as follows:

SUNDAY MORNING

Special and Memorial Services and Organ Recitals, Churches.

SUNDAY AFTERNOON AND EVENING

Reception for Distinguished Guests and State Sponsors. Baseball Games, Golf, Skeet, Tennis. Concert and Negro Spirituals, City Auditorium.

MONDAY MORNING

Opening of Exhibitions. Opening of Window Display Contents by Local Merchants. Golf, Tennis, Skeet, Pistol and other Tournaments commence.

MONDAY NOON

Welcoming Luncheon for Visitors and Sponsors, De Soto Hotel.

MONDAY AFTERNOON AND EVENING

Lectures, Moving Pictures and Addresses. Paper Products Exhibition, City Auditorium. Meetings of Trade Associations, De Soto and Savannah Hotels. Visits to Industrial Plants, Sightseeing, Sports, etc. Informal Dinners for Visitors, Sponsors, Trade Associations, etc. Presentation of Historical Pageant. "The Story of Paper." Community Dance and Coronation Ball for King, Queen and Court of Papyrus.

TUESDAY MORNING

Exhibitions open 9 A.M. to 6 P.M., 7 P.M. to 10 P.M. Coronation Parade of Decorated Floats, representing The Age of Cellulose.

TUESDAY NOON

Luncheon and Meeting Sponsored by Southern States Pulp and Paper Club. Special Luncheon and Fashion Show for Ladies.

TUESDAY AFTERNOON AND EVENING

Industrial Visits, Lectures, Sightseeing. Air Show, Horse Show, Fleet Visit and Sports. Governors' Banquet and Ball, De Soto Hotel. Historical Pageant, second presentation. Informal and Community Dances. City Market.

WEDNESDAY MORNING

Exhibitions open 9 A.M. to 6 P.M., 7 P.M. to 10 P.M. Grand Parade. Decorated Floats and Civic, Industrial, Military, Naval Units.

WEDNESDAY AFTERNOON AND EVENING

Military and Naval Review, Drill Competitions, Colored Baby Parade, etc. Annual Show, Savannah Kennel Club, Fair Grounds, all day. Papyrus Masque Ball and Buffet Supper, De Soto Hotel. Historical Pageant, third presentation. Carnival and Street Dancing, Mummers, Parade. Community Costume Dance, City Market, Drawings for Prizes.

GENERAL

Special Tournaments will be arranged for Golf at Savannah Golf Club, Bacon Park and Oglethorpe Courses. Tennis at Savannah Golf Club and Daffin Park. Also Skeet and Pistol competitions.

Ocean Bathing and Fishing can be enjoyed at Tybee Beach.

For additional information address D. G. Moon, managing director Southern Paper Festival Association, Savannah, Ga.

"The Flying Cloud"

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 3, 1939—*The Flying Cloud*, a four-page sheet, 11x17, issued to printers and manufacturers by Knight, Allen & Clark, Inc., a firm which has recently removed from 295 Congress street to larger and more desirable quarters at 275 Congress street to meet the requirements of an increasing business, is a suggestion for a "unique form of advertising" and "carries our hearty thanks to all our customers."

The publication contains a description and illustrations of the exceedingly attractive new offices and warehouse, with pictures of the officers and staff, and a map, showing the strategic location in the paper district.

Nathan S. Clark, president, extends greetings to customers, noting a liberal stock of desired items immediately available. In another article, Mr. Clark gives a history of the firm, founded in 1919, by the partners, Carleton Knight, George D. Allen and Nathan S. Clark, all of whom had learned the paper business at W. H. Claflin Company of Boston, having already served at that time a total of fifty-seven years. He notes their first location at 177-179 High street, Fort Hill Square, the death of Mr. Knight in 1926, and the retirement of Mr. Allen in 1934.

Frederic G. Lockwood took an interest in the firm in 1936 and since his advent nine salesmen have been added to the force. Mr. Lockwood reports that a recent analysis shows substantial purchases during the last year from more than 70 paper mills. Massachusetts mills predominated, but other states include Michigan, New York, Connecticut, Wisconsin, Pennsylvania, Indiana, Ohio, District of Columbia, Maine, New Hampshire, New Jersey, Kansas, Vermont and Virginia.

John C. Hurd, for the last two years executive secretary of the New England Paper Merchants Association, who has been in close touch with the industry practically all the time since graduating from Harvard in 1910, recently joined the firm. Mr. Hurd will be at the service of customers, making suggestions as to types of paper for particular jobs, color schemes, and dummies of all sorts, at their request.

The scope of lines has been broadened and grades constantly improved.

The firm now consists of Nathan S. Clark, president; Frederic G. Lockwood, treasurer; L. R. Mathers, vice-president; Walter F. Temple, vice-president; M. L. Simpson, secretary, and Mary T. Dunphy, assistant treasurer. The organization now numbers 26 men and women.

The broadside is printed on the Norse 32 lb. Envelope, made by the U. S. Envelope Company, Springfield, Mass.

Sales Training Soon for Paper Industry

The amount of paper and paper products consumed by nations is an accurate index of national literacy. America, for instance, uses about 200 pounds per person annually, which is higher than that of any country in the world.

But despite the large amount of paper used in this country, only a small beginning has been made, according to John L. Richey, speaking for the Paper and Twine Club. If the proper sales cultivation is given to old and new markets, much more paper will be consumed than is being used currently. Education can do much, too, toward exerting a stabilizing influence and eliminating uneconomic tactics which tend to demoralize the industry. Those twin objectives are to be achieved in the near future, according to this well-organized group of the paper and paper products industries by a program of bed-rock education in paper salesmanship.

There have been praiseworthy attempts in the past, by various individual concerns or small organized groups in the manufacturing, conversion and distribution divisions of the industry, to provide a real program of sales education. Probably all of them have done some good. But there has been no standardized, systematic effort on any large scale that undertakes a trade-wide job in this direction.

The proposed course in salesmanship, while being industrially specific, will be in no way biased or limited to the needs or viewpoints of any individual or group within the paper industry. Salesmen and sales executives of manufacturers, converters, and distributors are to be enrolled. The program has been designed to promote healthy profitable business conditions for all parties engaged in the industry through complete understanding of the products, methods and present shortcomings, as well as the principles of creative selling.

A heartening angle to this coming activity of the Paper and Twine Club is the fact that this training course is being developed from within the industry—by men who know the needs and problems of the business—by men who have learned their lesson by bitter experience in the "College of Hard Knocks." This fact alone almost guarantees the worth and quality of the training program. Then, in order to put this course on a sound and practical basis, the Paper and Twine Club has secured the services of one of the outstanding educational organizations in the country. This institution has a record of success in extension work, including home study and clinical courses in many other industrial fields, covering a period of 22 years.

This course will be in the nature of an extension course which will open with a very comprehensive discussion and exposition of the technological phases of the production of both fine and coarse papers, to be followed by the most complete and comprehensive sales training program ever prepared for the members of the paper industry.

To keep down the cost of the course to the individual, an underwriting program will be developed from within the industry. The nature of this appeal and information about the course will soon be available for publication.

This announcement is one of the most encouraging pieces of news within the last generation. If the paper industry needs anything, it needs intensive sales training. This is true all along the line—even among many experienced fellows who have allowed obsolescence to creep into their own sales methods. The hiring, training and firing of salesmen in the paper industry has consumed untold hundreds of thousands of dollars. The trial-and-error method now being used by most manufacturers, converters and jobbers in their sales training programs has most certainly been a costly burden upon the industry.

Congratulations to the paper industry in general and to the Paper and Twine Club in particular for their work in solving the most pressing problem facing our industry today!

N. Y. Brotherhood Elects Officers

CARTHAGE, N. Y., January 3, 1939—The annual meeting of the Northern New York District Council of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers was held here recently at which officers for the year were chosen. The principal speakers were Jacob Stephan, general representative of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, and E. B. Lambton, first vice president of the organization. Mr. Stephan reviewed recent steps in unionizing mills in this section. He discussed conditions at the Rushmore Paper Company of Natural Dam, and urged the officers of the organization to assist in remedying what he termed unsatisfactory labor conditions. The growth of unions in the paper industry of the Pacific Coast was discussed by Mr. Lambton who said that mills in California, Oregon and Washington are well organized. Union members on the coast number approximately 15,000, he said, which is the result of a program started several years ago. He stated that the International Brotherhood now boasts a membership of approximately 27,000, of which number 98 per cent are in good standing. The union organization has increased four times in membership and finances during the past few years. Officers elected for the next year include the following: Kyler Paul, of Harrisville, president; Ernest Noakes, of Dexter, first vice president; Deforest Carter, Harrisville, second vice president; Hubert Burls, Norfolk, third vice president; Wilfred G. Crossman, Watertown, fourth vice president; John Hayes, Deferiet, recording secretary; Clarence Faulds, Watertown, financial secretary, and William Tyo, Norfolk, treasurer. Mr. Burls succeeds Donald Robinson as third vice president. The meeting was followed by a banquet.

Minnesota Paper Sells Caslon

The Munising Paper Company announces the appointment of the Minnesota Paper and Cordage Company, 730 Washington avenue, North Minneapolis, Minn., as distributors of the Caslon and Energy lines.

Caslon Bond, Caslon Mimeograph Bond and Caslon Ledger, Munising's watermarked sulphite papers as well as the unwatermarked line of Energy Bond, Energy Ledger, Energy Mimeo, Energy Opaque and Energy Duplicator are completely stocked in white, colors and special finishes.

Operating Under Wage and Hour Law

Employers confronted with the problem of complying with the provisions of the new Wage and Hour Law will find in the book, "How To Operate Under the Wage and Hour Law", a clear and helpful source of information and guidance for use in making necessary adjustments as dictated by the new regulations.

This timely book published early this month, has been written entirely from a layman's point of view and is in no sense a text-book or "treatise".

This 248-page explanation of the law's provisions has been compiled by Alexander Feller and Jacob E. Hurwitz, able labor law counsellors, and experienced advisers to both employer and to labor ever since the advent of the NRA. Business men may remember them for their labor book, "How To Deal With Organized Labor", published by the same firm last year.

In this, their most recent book, the authors, Feller and Hurwitz, have dealt objectively with the problems raised by the new wage law and have endeavored, wherever possible, to suggest definite rules for action which will enable employers to meet the law's requirements effectively and economically.

An interesting innovation introduced by the authors is an outline of the workings of the Wage and Hour Law, presented in chart form. Here the reader may literally get a quick "picture" of the way the law is set up and how it operates. A second chart entitled, "Responsibility for the Violations of Others", reveals some of the lesser-known implications contained in the law which are further emphasized in the text.

A valuable contribution to the problem of determining just who is, and who is not, subject to the law is found in a revealing analysis of present-day interpretations of Interstate Commerce. Here the authors have presented for the first time in a non-technical book, the approach to the Commerce question according to the current theory of "industrial integration". This entire subject of Interstate Commerce has been explained in simple language so that any employer can easily determine whether or not he comes under the jurisdiction of the Commerce clause.

Among the important points brought out by the book are several effects of the Wage and Hour Law which have thus far escaped general publicity and discussion. Most notable of these is the matter of the system of interlocking responsibility which the law has set up to make the handler of "substandard" goods equally as liable with the original producer or processor who violated the law. This, the book points out, makes it possible for an interested person to use an alleged wage-hour violation as a pretext for legal action aimed at prohibiting a manufacturer or processor from selling or distributing his products.

The authors carry this idea further by explaining that employers, for instance, who fail to "play ball" with a warring labor union may easily find themselves confronted not only with a strike within their plant but also be served with a court order preventing their customers from handling or shipping the plant's products. If this forecast of a revamping of labor's strategy is correct, it becomes the immediate concern of every purchaser or distributor of goods to take steps to protect himself against losses and damage resulting from the violations of others and to seek whatever safeguards possible against unwarranted attacks.

As a measure of protection for intermediaries who may find themselves liable for the law violations of others, the book presents a model Warranty which will provide business men with the basis for construction of a form for use on order blanks, sales memoranda, invoices, etc. This Warranty, properly applied to cover distribution in the state or states under consideration, enables the purchaser of "tainted" goods to recover for losses resulting from the breach of the Warranty by a wage-hour violation.

HOW TO OPERATE UNDER THE WAGE AND HOUR LAW, by Feller and Hurwitz, 248 pages, cloth bound, published by The Alexander Publishing Company, Inc., New York, N. Y., $3.50.

TAPPI Notes

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry will meet at the Engineers Club, Philadelphia, Pa., on Friday, January 13, 1939 at 6:30 P.M. Charles G. Weber of the Bureau of Standards Paper Section, will talk on "Studies on Paper for Lithographing." On February 10 Robert B. Wolf, manager of the Weyerhaeuser Timber Company, Pulp Division, will talk on "Recent Developments in the Manufacture of Sulphite Pulp." Anyone interested in these two meetings will be welcome.

The annual meeting of the Technical Association will be held at the Roosevelt Hotel, New York, N. Y., February 20-23, 1939. More than sixty papers of real value will be presented at this meeting and will be of vital interest to every operating executive, chemist, superintendent and engineer in the industry.

A. J. Luth, formerly of the Crossett Paper Mills is now with the Michigan Alkali Company, Wyandotte, Mich.

H. G. Davis, recently with the Combined Locks Paper Company is now control engineer for the International Paper Company, Niagara Falls, N. Y.

Flavius Sebeste has left the Mohawk Paper Company and is now with the Foster Paper Mills, Utica, N. Y.

W. O. Johnson, formerly manager of the Strathmore Paper Company is now executive director of the Hampden County Tuberculosis and Public Health Association, Springfield, Mass.

W. P. Richardson, recently with A. D. Little, Inc., is now with MacAndrews & Forbes, Camden, N. J.

To Be Superintendent at Coshocton

H. C. Funsett, formerly superintendent at mills of Hagar Straw Board and Paper Company, Cedarville, Ohio, and Ball Brothers Company, Noblesville, Ind., has assumed the duties of superintendent at the mill of The Coshocton Straw Paper Company, Coshocton, Ohio.

Clay V. Watson, who had been superintendent at the Coshocton mill for twenty-one years, died December 19, 1938, from various complications.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 4, 1939—The Government Printing Office has announced the following paper awards.

Mathers-Lamm Paper Company will furnish 18,300 pounds (150,000 sheets) of 28 x 34—122 lbs., 25 per cent rag, white ledger paper at 7.98 cents. Old Dominion Paper Company will furnish 150,000 sheets of 17 x 22—40 lbs., white gummed paper at $4.619 per M sheets. Aetna Paper Company will furnish 8,400 pounds of 50 per cent rag, white index paper, 22½ x 28½—280 lbs., at 8.83 cents. Barton, Duer & Koch Paper Company will furnish 58,200 pounds, 50 per cent rag, 21 x 32½—194 lbs., white index paper at 8.47 cents; also 12,740 pounds, 50 per cent rag, 22½ x 28½—182 lbs., white index paper at 8.576 cents; and 7,240 pounds, 50 per cent rag, same, 22¼ x 28¼—362 lbs., at 11.39 cents. Bids for all of these items were received on December 14.

Mudge Paper Company will furnish 10,000 pounds each of No. 2 kraft wrapping paper in 36 and 48 inch rolls at 3.04 cents and the same firm will also furnish 16,000 pounds same, 36 and 48 inch at 3.27 cents. Bids for these items were received on December 9.

Cauthorne Paper Company will furnish 38,500 pounds (250,000 sheets) of 38 x 48—154 lbs., M.F. book paper at 4.79 cents. Perkins-Goodwin Company will furnish 40,000 pounds of white sulphite writing paper in 21 inch rolls at 4.25 cents. Cauthorne Paper Company will also furnish 71,600 pounds (400,000 sheets) of 33 x 43—179 lbs., white antique book paper at 4.59 cents. Aetna Paper Company will furnish 18,300 pounds of 50 per cent rag, 28 x 34 white bond paper at 8.698 cents and 4,075 pounds of 25 per cent rag, 28 x 34 buff bond paper at 8.17 cents. Marquette Paper Company will furnish 40,750 pounds of 28 x 34 yellow sulphite writing paper and 14,350 pounds 32 x 42 salmon sulphite writing paper at 5.43 cents. Bids for all of these items were received on December 7.

Barton, Duer & Koch Paper Company will furnish 33,800 pounds (200,000 sheets) of 28 x 41 dull coated book paper at 11.62 cents. The same firm will also furnish 10,000 pounds (38,000 sheets) of 38 x 38 chemical wood manila paper at 5.5 cents. R. P. Andrews Paper Company will furnish 7,040 pounds of 50 per cent rag, 38 x 40 M.F. lithograph paper at 9 cents. Mudge Paper Company will furnish 35,000 pounds of 22½ x 28½ jute tag board at 7.55 cents. Barton, Duer & Koch Paper Company will furnish 19,400 pounds of 32 x 48 light weight M.F. book paper at 5.64 cents. Bids for all of these items were received on December 5.

Whitaker Paper Company will furnish 44,400 pounds of 36 x 48 green sulphite writing paper at 5.43 cents, and the same firm will also furnish 5,000 sheets of 24 x 36 brown cloth lined paper at $122.88 per M sheets, bids for which were received on December 2.

The Printing Office has also received the following bids for 24,560 pounds (80,000 sheets) of 50 per cent rag, 38 x 48 coated book paper; Virginia Paper Company, 11.75 cents; Graham Paper Company, 11.6 cents; Marquette Paper Company, 11 cents; Enterprise Paper Company, 11.61 cents; Walker, Goulard Plehn Company, 11 cents; Whitaker Paper Company, 11.6 cents; Barton, Duer & Koch Paper Company, 11.5 cents; and Stanford Paper Comapny, 11.3 cents.

For 2,348 pounds (25,120 sheets) of 50 per cent rag, 32 x 42 yellow bond paper; Aetna Paper Company, 12.68 cents; Barton, Duer & Koch Paper Company, 14 cents; Graham Paper Company, 13.49 cents; and Mudge Paper Company, 15.28 cents.

For 2,066 pounds (5,000 sheets) of 100 per cent rag, 35 x 46 white chart paper; Graham Paper Company, 22.14 cents; and Barton, Duer & Koch Paper Company, 17.5 cents.

For 97,200 pounds (600,000 sheets) of 31½ x 48 white sulphite writing paper; Perkins-Goodwin Company, 4.6 cents; Old Dominion Paper Company, 5.2547 cents; Stanford Paper Company, 5.4 cents; Barton, Duer & Koch Paper Company, 4.6 cents; R. P. Andrews Paper Company, 4.9 cents; Whitaker Paper Company, 4.95 cents; Aetna Paper Company, 5.47 cents; Marquette Paper Company, 4.75 cents; Mudge Paper Company, 5.16 cents; Mathers-Lamm Paper Company, 5.19 cents; and Butler Company, 6 cents.

For 144,000 pounds (2,000,000 sheets) of 21 x 32 white sulphite writing paper; Perkins-Goodwin Compand, 4.6 cents; Old Dominion Paper Company, 5.2547 cents; Stanford Paper Company, 5.4 cents; Barton, Duer & Koch Paper Company, 4.6 cents; R. P. Andrews Paper Company, 4.9 cents; Mathers-Lamm Paper Company, 5.19 cents; Mudge Paper Company, 5.16 cents; Aetna Paper Company, 5.47 cents; Marquette Paper Company, 4.75 cents and Butler Company, 5.75 cents.

Returns From 76,000-Mile Trip

J. F. Mitchell-Roberts, export manager for Oliver United Filters Inc. New York, Chicago and San Francisco has just returned from a two-year trip which took him around the world. He covered practically every country in which the company has business interests, with the exception of those in Latin America which he expects to visit a little later. He visited not only all the company's agents but also many plants in connection with mining, sugar, chemicals, paper, sewage, cement and petroleum in which Oliver United filters are being used. In all, he travelled about 76,000 miles, returning with a comprehensive picture of the industrial situation in foreign countries, particularly the Far East.

N. F. Greenway to be General Manager

E. Victor Donaldson, president of Robert Gair Company, Inc., New York, N. Y., announced the oppointment of Norman F. Greenway to the newly created office of general manager, effective January 1, 1939. Norman F. Greenway is at present resident manager of the Piermont plant, the Company's largest folding carton factory.

Income Security Plan

On January 1, 1939, the Fitchburg Paper Company will put into operation a form of income security plan which will permit its hourly wage employees to receive regular weekly income during subnormal periods of inactivity which occur in the paper industry. The plan will enable the employees to receive advances from the company so that income during slack or idle periods will not be less than 60 per cent of the normal weekly wages in the case of employees with service of more than five years and 40 per cent of such wages when employed from two to five years. Amounts advanced by the company will be repaid without interest by the employee but only through an opportunity to work.

Comparable to General Motors Plan

The plan is comparable in most respects to an income security plan recently adopted by the General Motors Corporation. While conditions in the paper industry are quite different than they are in the automotive industry, it is believed that this plan will create a feeling of security in the minds of employees by assuring them a minimum weekly income.

Attempting a plan of this sort in the paper industry might result in some considerable loss to the company but the greater security provided for the employees it is expected will justify the risk involved.

The Fitchburg Paper Company has established the following plan for the hourly wage employees of the company and the Decotone Products Division:

1. The plan is effective as of January 1, 1939, subject to such changes and modifications as may be required by experience and the circumstances then prevailing.

2. Permanent employees who have service records of five years or more will be entitled to the following:

A. If, in any week during which this plan is operative, the employee's earnings from the company and/or other employment are less than 60 per cent of his regular 40 hour weekly wages, the company will advance, at the option of the employee, the difference between his actual earnings and 60 per cent of his standard weekly wages, less any Unemployment Compensation to which the employee may be entitled. This advance will assure each employee that his or her weekly income will be at least 60 per cent of their standard 40 hour weekly wages.

B. Advances will be repaid by the employee without interest, but only through an opportunity to work. Whenever subsequent weekly earnings are in excess of 60 per cent of the standard weekly earnings, one-half of the excess shall be applied to the reduction of all advances, until they have been repaid.

C. Any amount due the company for advances shall be cancelled in the event of death of the employee.

3. Permanent employees who have service records of two to five years will be entitled to the following:

A. If, in any week during which this plan is operative, the employee's earnings from the company and/or other employment are less than 40 per cent of his regular 40 hour weekly wages, the company will advance, at the option of the employee, the difference between his actual earnings and 40 per cent of his standard weekly wages, less any Unemployment Compensation to which the employee may be entitled. This advance will assure each employee that his or her weekly income will be at least 40 per cent of their standard 40 hour weekly wages.

B. Advances to this group of employees will be limited to the equivalent of 72 hours' earnings.

C. Advances will be repaid by the employee without interest, but only through an opportunity to work. Whenever subsequent weekly earnings are in excess of 40 per cent of the standard weekly earnings, one-half of the excess shall be applied to the reduction of all advances, until they have been repaid.

D. Any amount due the company for advances shall be cancelled in the event of death of the employee.

Rules Covering The Operation of the Plan

(a) The company's standard working week is forty hours, with time and a half pay for overtime.

(b) The standard weekly earnings of an eligible employee are defined as 40 hours pay at his latest hourly rate.

(c) Advances will be granted upon written application on forms to be provided by the company.

(d) The benefits of the plan are granted exclusively to the employees of the company and the Decotone Division, are not assignable and will continue in effect until further notice by the management.

(e) No employee will be granted an advance who has voluntarily quit or has been discharged for cause; or for any week in which he is absent from work for personal reasons, or because of disciplinary lay-off, or for any week in which he refuses to accept employment offered to him, if he is capable of performing the work; or for any week in which he is idle as a result of a labor dispute in the plant in which he works.

(f) In the event of fire, flood, wars, riots, strikes or other circumstances beyond the control of the management of the company, which cause company employees to be idle, or in case of a change through legislation, or otherwise, in the standard work week as above set forth, the company reserves the right to suspend in whole or in part the granting of advances under these plans.

(g) The plan will cease to be operative as to any employee whose connection with the company is terminated.

Obituary

George S. Lewis

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, January 3, 1939 — George Sherman Lewis, 73, nationally known in the lumber industry and also the paper and pulp manufacturing industry, died instantly of a heart attack in his home at 73 Fairfield avenue on the afternoon of December 30th. He was president and founder of the Hampden Lumber Company of Springfield and the Ely Lumber Company of this city.

He was at one time receiver for the Hilton-Dodge Company of Georgia and was a vital factor in the restoration of the company. He later became treasurer of the Wilmington Lumber Company and the Wilmington Pulp and Paper Company; was treasurer of the Howland Pulp and Paper Company of Howland, Me., and served in like capacity for the Aroostock Pulp and Paper Company of Van Buren, Me. He had many other business interests.

He was survived by his nephew, J. Roy Lewis, associated with him in the Ely Lumber Company and a neice, Mrs. Donald Campbell of Minneapolis, Minn. The burial was December 31 in this city.

Frank McEwan

Frank McEwan, secretary-treasurer of the Newark Boxboard Company, Newark, N. J., and president of the Madison Trust Company, Madison, N. J., was killed in an automobile accident December 20. Eyewitnesses said Mr. McEwan in attempting to take a turn at too great a speed, struck an obstruction and the car turned over twice. Death was due to a skull fracture, chest and internal injuries.

Mr. McEwan was born in Bloomfield, N. J. His father, Frank McEwan, founded a paper company in Whippany and at his death a son Arthur succeeded to the business. Frank and a brother Frederick, organized the Newark Boxboard Company. A resident of Madison for thirty-four years. Mr. McEwan served as councilman from 1912 to 1915, became a director of the Madison Trust Company in 1914, and was a director of the First National Bank of Madison from 1918 to 1932, when he became president of the Madison Trust Company.

Mr. McEwan was a director of the Morristown & Erie Railroad Company, a 32d degree Mason, a member of the Morris County Golf Club, the Canoe Brook Country Club, and a life member of the Madison Elks.

Surviving are his widow and a daughter. Funeral services were held at the family home in Madison.

Thomas W. Maguire

[FROM OUR REGULAR CORRESPONDENT]

SOUTH PORTLAND, Mo., January 2, 1939—Thomas W. Maguire, 76, engineer, who directed construction of the Portland bridge and paper mills and bridges in various other parts of the United States and Canada, died December 29 at his home here. He was a native of Island Pond, Vt.

In early life Mr. Maguire resided in Boston and served as a sergeant-major in the old ninth regiment, now the 101st regiment of the Massachusetts National Guard. He directed the construction of many residences in Berlin, N. H., and during the world war was in charge of the concrete work for gun placements and breastworks at the forts about Portland harbor.

Before his retirement, several years ago, Mr. Maguire was construction superintendent for a local firm of contractors. He leaves his widow, a daughter, two sons, and several sisters and brothers.

Winston Bone

[FROM OUR REGULAR CORRESPONDENT]

BERLIN, N. H., January 3, 1939—Winston Bone, 30, chemical engineer for the Brown Company, was found dead here December 20 in his room in a private residence. Death was due to heart disease.

Mr. Bone, a native of Madison, Wis., was a graduate of the University of Wisconsin. Survivors are his mother and a brother in Madison.

John E. Noble

[FROM OUR REGULAR CORRESPONDENT]

SALISBURY, Mass., January 3, 1939 — John E. Noble, 67, former superintendent of the Champion International Paper Mill at Lawrence, died December 29 at his home on Beach road after a four-day illness. He retired five years ago. A native of Lawrence, Mass., he had lived here six years.

Mr. Noble leaves his widow, Minnie E. Noble, and a daughter, Mrs. Mildred Mason of Lawrence. The funeral was held Saturday and burial was in Merrimac.

Harry Pride

[FROM OUR REGULAR CORRESPONDENT]

Harry Pride, 55 years old, died at his home at Appleton, Wis., December 30 following illness with bronchial pneumonia. His father, the late C. B. Pride, was head of the former Tomahawk Pulp and Paper Company, Tomahawk, Wis., and Harry Pride was associated with him in operation of the mill for a number of years. Since the mill closed, Mr. Pride had operated a motor service business at Appleton. The survivors include his mother, Mrs. C. B. Pride; his widow; one son, Robert; one daughter, Catherine, and one brother, Bert. Burial took place at Appleton.

Clay V. Watson

Clay V. Watson, 61, superintendent of the Coshocton Straw Paper Company, died at his home in Coshocton, Ohio, December 19, after a short illness.

Mr. Watson was born in Baltimore, Ohio, and had been superintendent of the Coshocton company for the past 21 years. He was a member of Knights Templar lodge.

Surviving are his widow, six children and two sisters. Interment was in South Lawn cemetery.

Eugene Taylor

[FROM OUR REGULAR CORRESPONDENT]

Eugene Taylor, salesman for the Sutherland Paper Company, Kalamazoo, Mich., died December 27 at Kalamazoo. He was associated for a number of years with the Pulp Wood Company, Appleton, Wis., and the Marathon Paper Mills Company at Menasha, Wis., and during that time made his home at Appleton.

Canadian Technical Meeting

The annual meetings of the Technical Section of the Canadian Pulp and Paper Association will be held on Wednesday, Thursday and Friday, January 25 to 27, 1939. The meetings will be held in the Mount Royal Hotel.

The tentative program (subject to alteration) is as follows:

WEDNESDAY, JANUARY 25

A.M. Business Session
Chairman's Report
Report of chairmen of Committees
Discussion on report of Standards Committee in regard to
a. Standard method of disintegration of lapped groundwood.
b. Use of aluminum foil for check of Mullen Tester.
c. Polished or dull plates in standard sheet making.
"Progress Report on the Bell Drying System" by L. C. Anderson.

1:00 P.M. Technical Section Luncheon—Speaker—B. K. Sandwell.

WEDNESDAY, JANUARY 25

P.M. Report on the Questionnaire on Refining of Groundwood Screenings by E. D. Hyndman.
"The Batch Refining of Groundwood Screenings" by W. W. Holland.
"Continuous Flow Refining of Groundwood Screenings" by H. B. McAdam.
"The Use of the Haug Refiner for Groundwood Screenings" by H. A. Paterson.
"Temperature vs. Consistency for Groundwood Control" by J. D. Brown.

THURSDAY, JANUARY 26

A.M. Cellulose-Water Relationships by Dr. Otto Maass.
Pulping of Wood by Dr. F. H. Yorston.
Lignin Investigations by Dr. H. Hibbert.

1.00 P.M. Joint Luncheon with Woodlands Section. Speaker—D. C. Everest—President of American Paper and Pulp Association.
No session will be held in the afternoon.

FRIDAY, JANUARY 27

A.M. Discussion of practical mill problems
1. Slime
Report on Questionnaire by W. A. Ketchen, W. B. Campbell
Discussion on Slime to follow.
2. "Dirt in Paper"—paper on Vortraps by Skelton
Followed by general discussion.
3. "Suction Box Covers"
Result of questionnaire by W. B. Scott
Followed by general discussion.

P.M.
FRIDAY, JANUARY 27

1. Boiler Water Treatment by W. G. Scott.
2. Discussion on the use of Colloids in Boiler Water Treatment, by Dr. Betz.
3. Folding qualities of Boxboard, by W. B. Campbell.
4. Use of Sodium Aluminate in Paper Making, by T. W. Westlake.

7:00 P.M. Cabaret Dinner.

The Pulp and Paper Exhibition will be held at the Windsor Hotel during the Annual Convention, January 25, 26, and 27.

A. D. Little Discontinues Routine Testing

[FROM OUR REGULAR CORRESPONDENT]

CAMBRIDGE, Mass., January 2, 1939.—Arthur D. Little, Inc., consulting chemists and engineers of Cambridge, Mass., announced today the discontinuance of routine testing and chemical analysis, other than as required for the research and development work on which the organization is principally engaged. The reason for the change of policy was given as due to steady increases in the extent and variety of industrial research, requiring the full attention and physical facilities of the organization. According to the announcement, requests for routine analyses and tests will be referred to Skinner & Sherman, Inc., 246 Stuart street, Boston, Mass. Both Hervey J. Skinner and Herbert L. Sherman of that company were at one time executives of Arthur D. Little, Inc., whose officials expressed strong confidence in the qualifications and reliability of the Skinner & Sherman laboratories for this type of technical work.

To consolidate more effectively the transfer of its analytical business, Harold C. Parish, for many years assistant director of the analytical department of Arthur D. Little, Inc., is joining the staff of Skinner & Sherman, Inc., and Roger C. Griffin will serve on its board of directors for the coming year.

The Arthur D. Little organization was founded in Boston in 1886 by the late Arthur D. Little and Roger B. Griffin, father of the present Treasurer, and for over fifty years has conducted both testing and research activities. With the discontinuance of the analytical department, the full attention of its technical staff and the resources of its laboratories will be devoted to consultation, chemical engineering and industrial research.

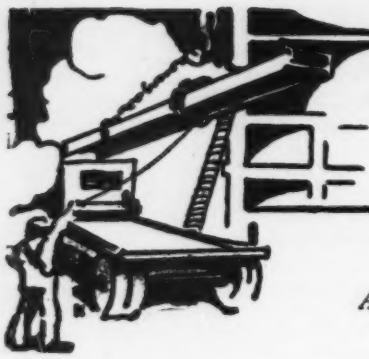
Service Pins Awarded at Carthage

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., January 2, 1939.—Forty employees of the local branch of the Crown-Zellerbach Corporation were awarded service pins at the annual banquet here which was attended by J. D. Zellerbach, of San Francisco. Charles A. Grondona, formerly superintendent here but now connected with the New York City branch, presided and the employees received service pins ranging from five to twenty years. Peter T. Sinclair, resident manager, and Glendon F. Loftus, office manager, were at the gathering, which was attended by all department heads.

Gives Employees "Dividend"

Moore Corporation, Limited, Toronto, has given all employees in Canada and the United States a "wage dividend" of one week's pay to a maximum amount of $50 per person. This marks the fourth consecutive year that the Moore Corporation has paid its employees a similar bonus. Shareholders are also receiving a bonus of 40 cents a share along with the regular quarterly dividend on January 3.



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Paterson, N. J.—The Berles Carton Company, Inc., 21-07 Forty-first avenue, Long Island City, New York, manufacturer of paper boxes and containers, lithographed and printed boxes, etc., has taken over property at Paterson, recently acquired for main plant, and will proceed with improvements in buildings and equipment installation. As lately noted in these columns, company has taken over part of former mill of the United Piece Dye Works, foot of Fifth avenue, Paterson, known as the Weidmann plant, approximating 98,000 square feet of floor space. It is proposed to remove present plant to new location and provide facilities for large increased capacity. Plant is scheduled to be ready for service at early date.

Niles, Ohio—The National Gypsum Company, 190 Delaware avenue, Buffalo, N. Y., manufacturer of wallboard and other gypsum products, is considering early rebuilding of portion of mill at Niles, recently destroyed by fire with loss reported close to $75,000, including equipment.

Chicago, Ill.—The Rudd Box Company, 10 South LaSalle street, recently organized with capital of 50 shares of stock, no par value, plans operation of local plant for production of a line of corrugated and other paper boxes and containers. New company is headed by M. J. Rudd and is represented by David A. Canel, 10 South LaSalle street, attorney.

Chattanooga, Tenn.—The Star Box and Printing Company, 1414 Chestnut street, manufacturer of corrugated boxes and containers, is awarding a number of sub-contracts for new local plant, previously referred to in these columns, including structural steel framing to the converse Bridge & Steel Company, 2408 Vance avenue; brick work, to Norris Brothers, Inc.; and roofing and sheet metal work, to General Home Improvement Company, 798 McCallie avenue, all of Chattanooga. Superstructure is being placed under way on three main plant units, each one-story, 250 x 320 feet, 150 x 300 feet, and 60 x 250 feet, respectively. Work also is in progress on new steam power house, 50 x 60 feet, and award for boilers, stokers and auxiliary equipment has been made to the Weigel Engineering Company, Provident Building, Chattanooga. Electrical work will be handled by the Terrell Electric Company, Inc., 1104 McCallie avenue, Chattanooga. The H. K. Ferguson Company, Hanna Building, Cleveland, Ohio, has general contract for erection. New plant will represent an investment of approximately $350,000, with equipment, and will have facilities for large capacity.

Manistique, Mich.—The Manistique Pulp and Paper Company, manufacturer of newsprint, is contracting for a normal supply of pulpwood at this time, with deliveries to begin in January and to continue until next summer. The requirements will represent an expenditure of about $150,000. The bulk of purchases is being made in the Manistique district.

Marrero, La.—The Celotex Corporation, manufacturer of building board, insulation board, etc., is beginning the shipments of raw material from its mill at Marrero, near New Orleans, to new plant at London, England, to be converted into finished products at that mill. The cargoes will total about 20,000 bales of bagasse, or sugar cane waste, per month, to meet the requirements of the foreign plant, which will specialize largely in insulation and wallboard for initial production. The new plant in England represents an investment of about $1,250,000, and as previously noted in these columns, will be operated by an affiliated company. It is stated that the bulk of raw material requirements will be furnished from the Marrero mill.

Chicago, Ill.—J. H. Stone & Sons, 1815 West 74th street, manufacturers of corrugated boxes and containers, are beginning superstructure for new one-story plant at 4150-70 West Forty-second place, Central Manufacturing District, where site was secured recently, and will push erection to completion at earliest date. New plant will be one-story, 300 x 500 feet, and will be equipped for large output. Present factory will be removed to new location as soon as the structure is ready. Entire project will cost close to $500,000, including machinery and equipment. The B. W. Handler Construction Company, 1261 South State street, Chicago, has the general erection contract, as previously stated in these columns. A. Epstein, 2001 West Pershing road, Chicago, is architect and engineer.

Port Wentworth, Ga.—The National Gypsum Company, 190 Delaware avenue, Buffalo, N. Y., will install an air-conditioning system in office building at new wallboard mill now in course of erection at Port Wentworth, near Savannah, and has awarded contract for the installation of a Carrier type system to the Bailey Electric Refrigeration Sales and Service Company, 143 King street, Charleston, S. C. Work will be placed under way soon. Company is pushing erection of new mill units and will have main structures ready for equipment installation in near future. New plant will represent an investment of about $900,000, including machinery.

Lufkin, Tex.—The Southland Paper Mills, Inc., organized a few months ago to construct and operate

a local newsprint mill, has announced that construction of main buildings will begin in January. Ground is now being staked out for the different structures, which will occupy a large tract of land. New mill will have an initial capacity of 50,000 tons of newsprint per annum and will represent an ultimate investment of close to $6,000,000. As previously noted in these columns, general contract for construction has been awarded to the Merritt-Chapman & Scott Corporation, 17 Battery place, New York, N. Y. George F. Hardy, 305 Broadway, New York, is consulting engineer. Ernest L. Kurth is president.

Vancouver, B. C.—A Company is being formed to construct and operate a local cellulose rayon mill. Mayor G. C. Miller, City Hall, has been active in negotiations for suitable site and has information regarding project. Proposed mill will consist of several one and multi-story units, with power house and other mechanical departments, and is reported to cost close to $350,000, with equipment. It is planned to begin work early in 1939.

New Companies, Etc.

New York, N. Y.—The Melwien Paper Company, Inc., has been incorporated with capital of 200 shares of stock, no par value, to deal in paper goods of various kinds. New company is represented by Irving Hoffman, 70 Pine street, New York, attorney.

Ypsilanti, Mich.—The National Felt Products, Inc., has been chartered with capital of $5000, to manufacture and deal in fiber products of different kinds. Alfred T. DeOtte, 14 North Washington street, Ypsilanti, is principal incorporator.

South Coventry, Conn.—The South Coventry Paper Company has filed a preliminary certificate of company dissolution under state laws.

Brooklyn, N. Y.—The Miro Paper Products Corporation has been organized to deal in paper products of various kinds. New company is represented by Alvin H. Minkoff, 70 Pine street, New York, attorney.

Chemical Engineering Economics

Chemical Engineering Economics, Second Edition, by Chaplin Tyler has just been published by McGraw-Hill. 241 pages. The first edition was published twelve years ago and as the author states there have been tremendous advances made in this time. Mr. Tyler is assistant director of the Public Relations Department of E. I. du Pont de Nemours & Co.

In the second edition more emphasis has been put on such subjects as marketing, organizations, patents, process development and research. Among the subjects covered are project analysis, plant location, unit operating costs, operation and control, cost, accounting, utilization of fuels and energy, and industry and the chemical engineer.

The question of adequate return on capital expended on new products and processes is featured. The mention of typical costs of unit operations, raw materials, packing, storing, labor and general expenses will be found to be of value in estimating costs of new ventures.

This is an excellent book for pulp and paper mill executives, engineers, chemists and superintendents. Copies may be obtained through the Book Department of the Technical Association of the Pulp and Paper Industry at $3.00 per copy.

SEE MORE NORMAL YEAR AHEAD

(Continued from page 11)

Wisconsin's new governor, Julius P. Heil, prominent Milwaukee manufacturer, was scheduled to give the plant its formal start by remote control from upper Grandfather Falls, where he was to speak at a luncheon to be given in the new plant. A number of men prominent in the paper and power industry were to be guests, and other addresses were scheduled by D. Clark Everest, president and general manager of the Marathon Paper Mills Company, Rothschild, Wis., Mark R. Byers, managing editor of The Record-Herald, Wausau, Wis., and C. R. Phenicie, vice-president of the Wisconsin Public Service Corporation.

Mills Credited for Strikeless Year

With strikes practically unknown to the paper industry in Wisconsin during the last year, the mills were given a part of the credit for a statement issued by the Wisconsin Labor Relations Board at Madison, Wis., in which it expressed gratitude for the very reasonable attitude taken towards its efforts by employers, laborers and the general public.

During its nineteen months of existence, the board settled by mediation 528 cases involving 111,496 workers. This represents three-fifths of the cases brought before it. It was necessary to issue only 51 complaints against employers and in only 23 cases was the board forced to render a formal decision.

One of the board's latest official announcements was to the effect that the Kimberly Papermill Workers' Union, made up of workers in the Kimberly-Clark Corporation's mill at Kimberly, Wis., has been certified as the bargaining agent for the mill, and at an election held recently the workers voted 533 to 33 to designate its union as the exclusive bargaining agency for all hourly paid production and maintenance employees. Official notice of the certification was received last week by Harold Fird, president of the union.

Commission Reports on Conservation

Notable progress was made during the last year by the Wisconsin Conservation Commission in reforestation efforts, largely to augment the future pulp wood and timber supply. County forest crop lands were increased by 116,000 acres, making a total of 1,739,140 acres now devoted to tree growing. The acreage of privately owned forest crop land now totals 150,710 acres, which includes forests of the Tomahawk Kraft Paper Company, Tomahawk, Wis., the Nekoosa-Edwards Paper Company, Nekoosa, Wis., and the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.

Makes Changes at Parsons Division

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., January 2, 1939.—Changes have been made in one of the three machines at the Parsons division of the American Writing Paper Corporation to produce ledger stock. Ordinarily this paper is produced at the Linden division but the latter has heavy unfilled orders on hand and steps are being taken to relieve this pressure at the Parsons. The driers at the Beebe-Holbrook plant, now used as auxiliary units, will be installed at the Parsons for the new production plant.

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COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-second Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 20-24.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, February 20-23.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 21.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel. New York. February 20-22.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

INDUSTRIAL RECOVERY

At the turn of the year when a new twelve month lies before us new hopes and resolutions are kindled. The old year has gone without regret, for 1938 was a lean industrial year during which fair profits of practically all industrial companies dwindled and the national income was substantially reduced. But fresh hope comes with this year and with a new set-up in the Seventy-sixth Congress just convened, there is good reason to expect better and more prosperous days lie immediately ahead.

A general reconciliation between government and industry through business adjustments effected by co-operation, is a great need to attain a full and sustained recovery. There are indications that a new spirit of reconciliation may be achieved between the important economic groups, such as industry, finance, labor, and perhaps agriculture, on some basis that will provide prosperity for all. Possibly, the establishment of the proposed Bureau of Industrial Economics in the Department of Commerce may prove to be in the months to come an agency for a better understanding through the dissemination of current statistical and other information. The publication of the facts as revealed by the current investigation of the Temporary National Economic Committee would undoubtedly help to establish a new basis of understanding and so lead to a high order of cooperative effort between these economic groups. Failure to see and consider industrial problems broadly has resulted in loss of billions of dollars through strikes to both industry and labor.

While the new Congress should repeal such socialistic legislation as has proved to be destructive to American business prosperity, speedy recovery is apparently just now largely dependent upon the reduction of the tax burden. A sub-committee consisting of Senators Vandenberg of Michigan and Herring of Iowa have been studying the idea of tax reductions for companies who would employ certain profit sharing practices of benefit to labor and industry as a whole, by giving such companies some reductions in taxes. In stating his opinion before the sub-committee, Alfred P. Sloan, Jr., chairman of the board of General Motors, proposed that the government encourage industry to scrap its old machinery and install new productive equipment by reducing the taxes of companies which do so.

"The country's production plant is obsolete," Mr. Sloan said, "and such a policy would, first of all, increase activity and employment in the lagging durable goods industry. Because of the greater efficiency of up-to-date machinery, this would soon be followed by a substantial and general increase in the productivity of the entire economic system. The only way you can raise wages is by increased productivity per man. It cannot be done in any other way. It does not matter how much you increase wages, prices go up too, unless productivity increases also."

In reference to the introduction of profit sharing systems, Mr. Sloan said he saw little possibility in such systems. "My viewpoint as to true profit sharing, is that it is not applicable as a broad procedure, simply because, outside of a limited number of special cases that always arise, there are not sufficient profits to apply an equitable formula and mean anything consequential to the worker except perhaps in limited periods of prosperity. It would be far better to use such available funds to assure the workers a continuity of income, by some such method as the loan system recently announced by General Motors. We need to supplement the workers' income in poor years, rather than try to increase it in the good years. A little something extra in good times serves to establish a standard of living that cannot be maintained. It causes dissatisfaction."

In commenting on the return on capital employed in industry, Mr. Sloan said in part: "For example, the return on capital employed by sixteen leading industrial organizations in their respective fields, with

capital of $100,000,000 or more apiece, has only been 8 per cent over the past fifteen years. In all manufacturing companies the average return is less than 5 per cent per year over this period. In addition to this profit limitation, I believe there are other real objections to true profit sharing; therefore its use should be determined by the judgment of individual management without application of the tax incentive principle.

"I believe that what industry can afford to pay to the worker in addition to the highest economic wage can best be used for promoting stability of income, or both. We need to supplement the worker's income in poor years, rather than try to increase it in the good years.

"The best application of the tax incentive principle appears to me to be a reduction of the general taxes on business, because it has the economic effect of reducing prices and stimulating greater productivity of industry, resulting in the expansion of present units and the development of new products so essential to an advancing standard of living. . . . Speaking generally, it is a fact today that America's production plant is obsolete, as measured by today's technology. The true way to enlarge present pay envelopes and provide more envelopes for more workers is to do those things that mean lower prices. This can only be accomplished by increased productivity. Today, the tax structure as constituted, and its administration, tend to discourage the substitution of the new for the old."

Brotherhood Meets at Fort Edward

FORT EDWARD, N. Y., December 27, 1938.—A conference of the executive board of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers was held here last week at which Fred Morris, of Madison, Me., was elected vice president. The meeting was presided over by John P. Burke. Mr. Morris succeeds J. W. Taylor, of Topsham, Me., who resigned his position as third vice president because of his selection recently as Maine's Commissioner of Labor. The board accepted his resignation with regret and commended him for his fine service as a union official for the past eighteen years. Mr. Morris becomes seventh international vice president of the organization and four vice presidents are advanced a post. John Sherman, of Port Angeles, Wash., from seventh international vice president to sixth; Raymond A. Richards, of Wisconsin Rapids, Wis., from sixth to fifth; S. A. Stephens, of Thorold, Ont., from fifth to fourth and William H. Burnel, of Espanola, Ont., from fourth to third. H. W. Sullivan, of Worcester, Mass., is second international vice president and Maurice La Belle, of Ottawa, Ont., first.

The international convention which assembles every two years will meet at St. Paul, Minn., March 14, 1939. The meeting last week was part of a two-day conference which was attended by twenty internationally prominent labor leaders of the pulp and paper industry.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Months	1938(c)	1937(c)	1936	1935	1934
January	63.9%	90.3%	76.1%	65.8%	.....
February	68.7%	90.1%	77.9%	70.0%	.....
March	69.6%	90.3%	76.0%	70.5%	.....
April	68.3%	92.1%	82.3%	70.0%	.....
May	69.0%	90.6%	81.6%	69.4%	.....
June	66.0%	87.3%	80.7%	72.3%	.....
July	72.0%	81.8%	77.3%	64.9%	.....
August	77.2%	82.9%	81.5%	70.9%	.....
September	76.3%	78.6%	80.5%	71.9%	58.2%
October	82.5%	73.5%	87.6%	75.6%	64.7%
November	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	54.5%	85.9%	71.2%	59.6%
Year Average	.....	80.6%	81.3%	70.5%	.....
First 51 weeks	72.5%	81.3%	81.3%	70.8%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1938		CORRESPONDING WEEKS, 1937	
*November 19	81.5%	November 20	62.5%
*November 26	74.4%	November 27	68.0%
*December 3	78.7%	December 4	61.0%
*December 10	77.8%	December 11	56.1%
*December 17	81.1%	December 18	60.0%
*December 24	77.6%	December 25	48.6%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks					
Ratio Limits	Nov. 19, 1938	Nov. 26, 1938	Dec. 3, 1938	Dec. 10, 1938	Dec. 17, 1938	Dec. 24, 1938
0% to 50%	63	97	60	62	57	41
51% to 100%	246	212	246	241	230	128
Total Mills Reporting	309	309	306	303	287	169

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Mos.	1938 (e)	1937 (e)	1936	1935	Mos.	1938 (e)	1937 (e)	1936	1935
Jan.	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61%	86%	67%	67%	Aug.	66%	74%	75%	65%
Mar.	60%	87%	68%	67%	Sept.	66%	70%	76%	69%
Apr.	57%	89%	70%	61%	Oct.	70%	66%	82%	76%
May	58%	86%	68%	61%	Nov.	64%	56%	79%	70%
June	56%	75%	68%	65%	Dec.	....	46%	74%	60%

Week end. Nov. 19, 1938—67%
Week end. Nov. 26, 1938—57%
Week end. Dec. 3, 1938—61%
Week end. Dec. 10, 1938—64%
Week end. Dec. 17, 1938—65%
Week end. Dec. 24, 1938—69%

(e) Basic figures revised to include new members of the National Paperboard Assn.

Swedish Newsprint Production Less

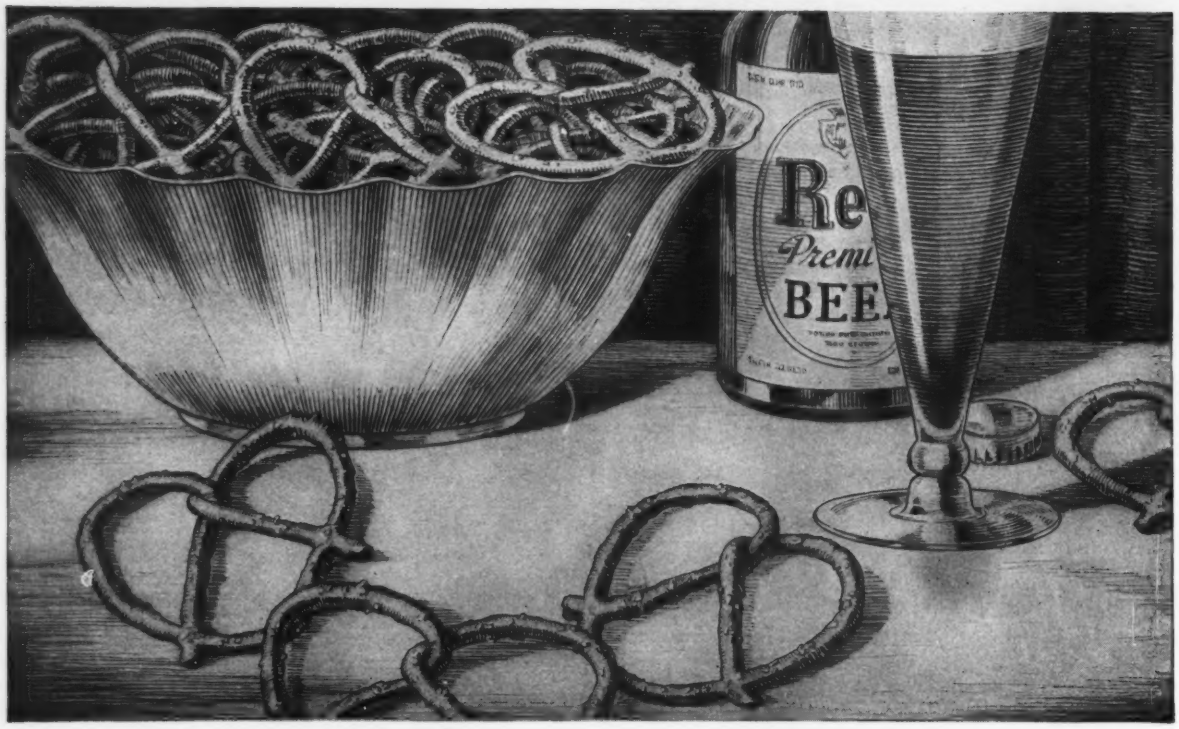
[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 3, 1939—Swedish newsprint production for the first nine months of 1938 totaled 183,804 metric tons as against 203,322 metric tons for the corresponding period in 1937, according to a report to the Department of Commerce from the office of the American Commercial Attache at Stockholm.

The United States was the principal purchaser of newsprint from Sweden in the nine months of this year with 40,508 tons, a substantial decrease from the 67,739 tons purchased during the corresponding period last year. The United Kingdom was second with the purchase of 14,472 tons, about the same in 1937, and Argentina 10,989 tons. The total exports amounted to 114,985 tons as compared with 148,871 tons during the corresponding period last year, the report stated.

During the third year of 1938 the pulp market has been chiefly characterized by conversions, generally connected with agreements to accept delivery of fresh quantities in 1939.

INTERESTING USES OF ALKALIES . . . NO. 1



How the Pretzel Gets its Shine . . .

WHETHER you are a beer drinker or not, you are undoubtedly familiar with that appetizing tidbit — the pretzel. But how many know that its inviting brown and glossy surface comes from a bath in a solution of Caustic Soda? After the dough has been twisted by hand or stamped by machine into the familiar shapes, the pretzels are placed on wire racks and dipped in a solution of 1 pound of Caustic Soda to 20 gallons of water. They then pass under an automatic salt shaker and on into the oven. In olden times the lye used was prepared by filling an old basket with wood ashes and pouring on boiling water, which filtered through into a tub.

While the amount of Caustic Soda used in a year's pretzel production is trivial compared with even a day's consumption by the paper, soap, textile or chemical industry, this application is an interesting example of the widespread use made of this common alkali. It also serves to emphasize the importance of extreme purity — a quality which COLUMBIA Caustic Soda possesses to a degree made possible only by eternal vigilance and a deep sense of responsibility by the inspectors and all other workers in the Production Department of the COLUMBIA organization.

COLUMBIA

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The Influence of Humidity on Changes in Diameter and Length of Sulphite Fibers*

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Abstract

By means of a constant humidity apparatus and a microscopic cell, the changes in fiber dimensions of individual wood pulp fibers have been studied over a cycle of 95 to 0 and 0 to 95 per cent relative humidity. Some of the results of the study are:

Fiber dimensions are definitely dependent on the relative humidity of the surrounding air. The dimensions of fibers in water and at equilibrium are not appreciably different. Hysteresis in fiber widths exists for the pulps studied; after the original desorption, hysteresis in fiber widths persists unchanged in the range of 0 to 95 per cent relative humidity.

Pulps cooked for 9.5 and 10 hours have average fiber diameters of approximately the same magnitude, but pulp cooked for 11 hours has a significantly larger average width at all humidities. Prolonged drying of the fibers at 103 deg. C. decreased the swelling of the fiber on adsorption by 50 per cent. Beating to a freeness of 650 decreased the total swelling on adsorption by 25 per cent; about the same result was observed on bleaching with 8 per cent hypochlorite. If the ratio of the total per cent change in width on adsorption of the unbleached pulps to the change in the treated pulps is taken as a measure of the relative effect of the treatment, the differences in the treatments are: beating to 650 freeness, 1.25; bleaching with 8 per cent hypochlorite, 1.30; drying at high temperature (103 deg. C.), 2.16.

Introduction

The facts known about the swelling and shrinking behavior of individual wood pulp fibers under atmospheric conditions of humidity are limited. The changes in fiber dimensions under various humidities have been measured, for the most part, by the gross effects observed in wood, paper, textiles, and the like. A limited study has been made of the changes in cotton hair dimensions with humidity change, but no similar study has been made of wood fibers isolated for papermaking uses or of the effects of commercial operations on the swelling and shrinking behavior of the fibers.

In this study the effect of sulphite cooking in the commercial range, the effect of overdrying, the effect of bleaching, and the effect of beating on individual fiber dimensional change at different humidities were investigated quantitatively. The moisture content was followed at the same humidities to see if there was a correlation between fiber dimension changes and moisture content.

Historical Survey

Sorption of Water Vapor and Sorption Hysteresis

The relationship between moisture content and the amount of moisture in the atmosphere was appreciated by Mueller *(1)* in 1882. Masson and Richards *(2)*, using a sulphuric acid desiccator, obtained a sigmoid curve expressing the relationship between moisture content and relative humidity. They noticed that there was a difference in equilibrium moisture content when the final humidity was approached from a higher and a lower humidity. Wilson and Fuwa *(3)* published data for a wide variety of materials, among which were pulp and paper. The values given were an average of those obtained on approaching the equilibrium humidity from either side.

Kujirai, Kobayashi, and Toriyama *(4)* worked with a number of fibrous materials and obtained typical sorption curves with a definite hysteresis effect in each. The curves showing the relationship between moisture content and relative humidity were smooth and the moisture content on desorption was higher than on adsorption at the same relative humidity.

Urquhart and Williams *(5-8)* were the first investigators to make extensive moisture sorption hysteresis experiments; they used cotton. The actuality of hysteresis was established beyond a reasonable doubt.

Several investigators *(9-14)* examined papers at different humidities and found that they exhibited hysteresis in moisture content. Moisture sorption of wood has been reported *(15-20)*. Hysteresis was found except at low vapor pressures.

Campbell and Pidgeon *(21)* made measurements on

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unbleached sulphite and unbleached kraft pulp. Filby and Maass *(22)* obtained data for wood, pulps, and rag cellulose. The results for cotton checked the data of Urquhart and Williams.

Seborg and Stamm *(23)*, Stamm and Loughborough *(24, 25)*, and Seborg, Simmonds, and Baird *(26)* used salt solutions to humidify the air and a quartz helix balance to measure the moisture sorption of various cellulosic materials, including sulphite and kraft pulps from various species of wood and lignin, and they pointed out the advantages of their method.

Seborg *(27)* has made a study of hysteresis under consecutive sorption cycles which substantiates the observations of Urquhart and Williams on cotton. The material was a commercial spruce sulphite pulp. After the initial drying, seven consecutive cycles showed no change in sorption hysteresis. The ratio of adsorption to desorption moisture content of a wide variety of materials in the range of 12 to 88 per cent relative humidity was calculated as a constant of 0.84 to 0.88 for a wide variety of materials.

Ulm *(28)* has studied the effect of humidity and temperature on the moisture content of boards. Hysteresis of moisture sorption was found at all temperatures.

Russell, Campbell, and Maass *(45)* have found that hysteresis in water vapor sorption for an unbleached sulphite, a bleached sulphite, and an unbleached kraft pulp proceeded in the usual manner.

In summation, it may be said that hysteresis loops for moisture content extending from saturation to nearly zero relative humidity have been found for many and varied kinds of cellulosic materials by investigators using carefully controlled conditions and small samples.

The Effect of Air on Hysteresis in Water Vapor Sorption

Patrick *(29)* has claimed that the hysteresis effect in silica gels is due to the presence of air. Further investigations with silica gel and sulphur dioxide and with water vapor and cellulose *(30, 31)* led him to believe that the hysteresis effect could be eliminated by the removal of the last traces of air. Pidgeon *(32)* criticized the work on silica gels and showed that the absence of hysteresis, claimed by Patrick to be due to the exclusion of air, was due to changing vapor pressure during sorption.

Sheppard and Newsome *(33)* found that repetition of adsorption cycles narrowed the hysteresis loop but did not decrease the adsorptive curve. Repeated evacuation to 5×10^{-3} mm. mercury pressure did not eliminate hysteresis. Urquhart and collaborators *(5-8, 34-36)* and Campbell *(37)* were unable to reduce hysteresis by working under reduced pressures as low as 10^{-3} mm. mercury. Sheppard *(38)* found that it was impossible to eliminate hysteresis after repeated evacuation to 5×10^{-3} mm. mercury pressure at the highest temperature possible without causing some decomposition of the material. Filby and Maass *(22)*, using helium to flush out other gases, checked the data of Urquhart and Williams. Walker, Campbell, and Maass *(39)* have recently worked with pressures of 10^{-2} to 10^{-5} mm. mercury and found the hysteresis effect to exist.

On the other hand, investigators working at atmospheric pressure have found no difference in hysteresis; such results may be found in the work of Seborg and collaborators *(23, 26, 27)*.

Therefore it would seem that the presence of air has little effect on hysteresis in water vapor sorption of cellulosic materials. For all practical purposes hysteresis in water vapor sorption exists, and the effect of air is negligible.

The Effect of Previous History of Sample on Sorption Moisture Content

Equilibrium moisture determinations reported in a large number of investigations have been made without knowing the entire previous history of the material. Much of the work has been done after desorption to dryness. Many of the differences in equilibrium moisture content are due to previous history of the sample.

Urquhart and Williams *(8)* found that the differences existing in raw cottons could be eliminated to a great extent by hot water extraction. Urquhart (34) reported that the first desorption value for cottons was not reproducible; a small permanent loss in hygroscopicity occurred. Cotton taken directly from the boll, before drying, was found to show a high sorptive capacity *(35)*. Data were presented *(36)* giving the moisture content as 40.27 per cent at 100 per cent relative vapor pressure at 25 deg. C. After desorption over phosphorous pentoxide and after adsorption, the moisture content was 22 per cent under the same conditions. The very great absorptive power of mercerized cotton was found to be reduced continually as the material was desorbed for the first time *(40)*.

Stamm and Loughborough *(24)* found that industrially dried wood samples all had moisture contents within the boundary of the primary desorption to dryness and adsorption curve. Pidgeon and Maass *(19)* found that wood on drying lost its sorptive power to some extent, especially at high relative humidities. Knight and Pratt *(41)* worked with green wood specimens. If desorption was to 60 per cent relative humidity and if the cycle from there to 90 per cent relative humidity was repeated, a closed hysteresis loop was obtained with the desorption part practically coinciding with the original desorption curve and the adsorption curve intermediate between the lines of the complete desorption to dryness and associated adsorption curve. Hysteresis loops between 50 to 80, 40 to 70, and 30 to 60 per cent obtained in a similar way gave values for the desorption part deviating more from the complete desorption curve as the lower humidity of the cycle was decreased.

The literature reviewed shows that an irreversible loss in hygroscopicity of cellulosic materials occurs during the primary desorption. Cotton, wood, and wood pulps all show this loss. After drying, the hysteresis in water vapor sorption persists unchanged at room temperature as shown by Seborg *(27)*.

The Effect of Temperature and Heat Treatment on Moisture Sorption

The effects discussed in the preceding section are those which might be expected under normal conditions. The effect of temperature at different humidities in the range of weather conditions is also of practical importance. The effect of abnormally high temperatures is also of importance from technical aspects.

Cellulosic materials which have been dried show a minimum moisture content in a range of humidities at high temperatures. Urquhart *(42)* made a critical

study of the effect of temperature on the water vapor sorption of cotton. He found that, if the relative humidity was constant up to 80 per cent, the moisture content decreased with temperature on adsorption from the dry condition. Above 80 per cent relative humidity there were two different effects. At temperatures from 10 to 50 deg. C. the moisture content decreased with increasing temperature; from 60 to 110 deg. C. the moisture content increased with increasing temperature. McKee and Shotwell *(11)* presented curves showing that at a constant relative humidity the equilibrium moisture content of papers decreased with increasing temperature up to 70 deg. F. Above this temperature the moisture content increased with increasing temperature. At a constant absolute humidity, they found the moisture content a constant between 60 to 110 deg. F. Ulm *(28)*, working with paper board, found that hysteresis existed for a wide range of temperatures and humidities that might be encountered under normal atmospheric conditions. The effect of temperature at high humidities was small, the moisture content passing through a minimum at 70 deg. F. At low humidities the moisture content decreased with increasing temperature. At a constant absolute humidity comparable to that of McKee and Shotwell the moisture content from 60 to 110 deg. F. was 11 to 5 per cent. Pidgeon and Maass *(19)* found the sorption of previously dried wood decreased with increasing temperature at constant humidity of 50 per cent from 23 to 42 deg. C.

The above change in sorptive power was not found for green wood by Loughborough *(24, 25)*. The drying of green wood at different relative vapor pressures and temperatures from 21 to 100 deg. C. showed a decrease in moisture sorption with an increase in sorption over the entire range.

Von Roessler *(43)* found that drying filter paper at 100 deg. C. at a low humidity decreased the moisture sorption. Urquhart and Williams *(5)* showed that raw cotton dried in an oven at 110 deg. C. was less sorptive than cotton dried over phosphorous pentoxide at 15 deg. C.

Urquhart *(35)* compared an untreated blank of wet cotton, a sample heated at 100 deg. C. in the air-dry condition, and a sample heated at 100 deg. C. in water vapor for 1 hour. All samples were dried over phosphorous pentoxide at room temperature, and the adsorption moisture contents for about 70 per cent relative humidity were in the following order: highest moisture content, sample heated in water vapor; blank; lowest moisture content, sample heated in dry air. Urquhart and Eckersall *(36)* found that wet cotton samples heated in an oven for a period insufficient to dry them showed a greater sorptive capacity. Russell and Campbell *(44)* performed experiments similar to those above on a bleached sulphite pulp dried at room temperature. Samples were heated in water vapor at 100 deg. C. and in dry air at the same temperature. When all the samples were saturated with water and desorbed, the sample heated in water vapor had the highest moisture content, and the sample heated in dry air, the lowest. After drying all samples over phosphorous pentoxide at room temperature, the untreated sample sorbed the most moisture, and the sample heated in water vapor the least.

Knight and Pratt *(41)*, working with wood samples of moderate size, found that drying at 100 deg. C. decreased the equilibrium moisture content more than drying at 50 deg. C. over phosphorous pentoxide. Weber and Snyder *(13)* found that oven drying of lithograph papers had little effect on the adsorption moisture content at room temperature and from 34 to 71 per cent relative humidity when compared with samples dried over phosphorous pentoxide. Russell, Campbell, and Maass *(45)* determined the moisture content of samples at reduced pressure over phosphorous pentoxide to be 0.35 per cent. On heating to 100 deg. C. the bleached sulphite pulp lost water but readsorbed it from the phosphorous pentoxide on cooling.

These experiments show that the moisture sorption of cellulosic materials may be increased by heating at high temperatures and high humidities and decreased by heating at high temperatures and low humidities. In all cases the greatest differences in moisture content were shown when the samples were in equilibrium with high relative humidities. The differences in moisture content were small. Urquhart *(5, 35)* and Campbell *(37, 44)* have presented similar explanations to elucidate this behavior. When cellulose loses water, it shrinks and adjacent molecules mutually satisfy each other. Upon adsorption of moisture part of the binding is permanent, giving a decrease in sorptive capacity. The effect of heating at low relative humidity is to drive out more water, effecting a greater shrinkage and more permanent bindings. Heating dried cellulose at a high relative humidity frees some of the bindings not freed at lower temperatures or humidities and the sorptive capacity becomes greater.

The Effect of Beating on Water Vapor Sorption

The idea that beating causes an appreciable change in moisture sorption has long been held in the pulp and paper industry and is still adhered to by Strachan *(46, 47)*.

Campbell and Pidgeon *(21)* beat an unbleached sulphite and a bleached kraft pulp for 2.5 hours and determined the moisture contents of the pulps on desorption and adsorption. The plotted values fell around the curve in such a way that any effect was so small as to be within the error of the experiment. Kress and Bialkowsky *(48)* beat a pulp in water and other liquids. They found that the so-called "hydration water" does not chemically combine with the pulp and that no hydrates exist after beating. Seborg and Stamm *(23)* found that beating an unbleached sulphite pulp for 8 hours had a negligible effect on the moisture content of the pulp. Adsorption-compression experiments *(49)* also indicated no significant difference in sorption.

Campbell *(37)* reported that the ratio of moisture sorption of the beaten pulp to the unbeaten pulp was slightly greater than 1.00. Mark *(50)*, treating artificial silk and pulp in a colloid mill, found that the moisture content was increased slightly. Sheppard and Newsome *(51)* stated that beating an alpha pulp did not cause any appreciable increase in moisture sorption. Salley (52) used a commercially beaten bleached sulphite pulp and found no increase in water vapor sorption.

Seborg, Simmonds, and Baird *(26)*, using an improved apparatus and a pulp beaten to a very low freeness, found that a beaten pulp adsorbed 0.2 to 3.5 per cent more moisture than the unbeaten pulp from low to high relative humidity. The increase averaged 6 per cent. Russell, Campbell, and Maass *(45)* have recently subjected pulps to extreme beating.

The ratio of moisture content of the beaten pulp to the unbeaten pulp was 1.05; or the increase occasioned by beating was 5 per cent.

Thus it may be said that the effect of beating is to increase the moisture content slightly. On very highly beaten pulps, the ratio of moisture content of the beaten pulp to that of the unbeaten pulp was 1.05 to 1.06; or the increase in moisture sorption was 5 to 6 per cent.

The Effect of Bleaching on Moisture Sorption

Work on the effect of bleaching on moisture content was reported by Fay *(53)* in 1926. Bleached pulp sorbed less water than an unbleached pulp. Urquhart, Bostock, and Eckersall *(40)* found that the effect of bleaching was to reduce the moisture sorption of cotton fibers.

The first extensive study on wood pulp was made by Seborg, Simmonds, and Baird *(26)*. At atmospheric pressure and 25 deg. C. both spruce and silver fir sulphite pulps sorbed less moisture after bleaching with hypochlorite. A silver fir sulphite pulp containing 1.0 per cent lignin and total pentosans of 4.8 per cent was subjected to bleaches of 8, 15, 18, and 25 per cent bleach powder and a reduction in hygroscopicity of 10.7, 11.6, 12.5, and 13.4 per cent was found throughout a relative humidity range to 93 per cent. The effect of bleaching in lowering moisture sorption is much greater than the increase occasioned by the severest beating. The decrease in moisture sorption caused by bleaches of 8, 15, 18, and 25 per cent hypochlorite was linear. There was no significant decrease in the lignin content or the pentosan content in the 8 per cent bleach.

The Effect of Moisture Content and Relative Humidity on Swelling

Swelling is a characteristic of cellulosic materials. Because of its anisotropic structure, cellulose shows a difference in dimensional change. Cellulose has a fine capillary structure which, on taking up moisture, causes swelling, but it has also a coarse capillary structure which may take up water without further change in dimensions. This ability to take up moisture in two ways complicates any method for determining the change in volume on swelling. Increase in weight cannot give a true indication of swelling for the same reason. Very little can be said even about such materials as wood, where internal changes are not known and may be very complicated. It is difficult to distinguish between fiber changes and changes in a dispersion of fibers, for example, in a sheet of paper. Because of the difficulty in measuring the changes in individual fibers and because of the statistical nature of the measurements, nearly all the data available on shrinking and swelling of cellulosic materials with moisture changes are for gross effects in wood, sheets of paper, and the like.

In the case of wood, over-all changes in external dimensions may be easily measured and volume changes are practically free from the effect of drawing together of structural units. Mörath *(20)* and Stamm *(54)* have both shown that the volume change in small sections of wood is a direct function of the moisture content at equilibrium from 0 to 100 per cent relative humidity. Above this point water may be taken up without increasing the volume. Swelling and shrinking are appreciably greater for a dense wood *(55)*.

Schwalbe *(56)* and Beiser *(57)* found that, in the swelling of wood, the fiber cavity dimensions were practically unchanged when a fiber saturation point of 30 per cent moisture was assumed. Beiser, by means of microscopical studies of wood, showed that, on swelling of the wood, the fiber cavities of springwood increased either very slightly or not at all in diameter but that the fiber cavities of summerwood decreased slightly in size. Stamm *(58)* obtained data by permeability tests with air of different humidities showing that the size of cavities change very little on swelling and shrinking.

The evidence indicates that the change in volume in swelling is roughly equal to the volume of water adsorbed up to the fiber saturation point.

No such general statement can be made concerning the directional changes in wood. The directional swelling depends on the orientation of the fibrils within the fibers, the orientation of the fibers in the wood structure, their bonding, and stresses set up by drying and chemical differences. In wood the tangential swelling is 5 to 12 per cent, the radial swelling 2 to 7 per cent, and the longitudinal swelling a fraction of 1 per cent *(59)*. The longitudinal swelling is an expression of the changes in length of the individual fibers, since the greater mass of the fibers is oriented in this direction. The swelling in the radial dimensions is limited by the ray cell structure.

Data on the actual dimensional changes of individual cellulose fibers are very scant. Clayton and Peirce *(60)*, from frequency distribution, computed the mean area of the cross section of the cotton hair at 40 per cent relative humidity. The increase in dimensions from 0 to 40 per cent relative humidity was 0.04 per cent in length and 0.14 per cent in width per unit relative humidity change. Mercerized fibers took up more water but did not swell as much. Collins *(61)*, using a microscope and cell to measure diameter and length change, has collected data which are internally more consistent. The swelling of the cotton hair showed a hysteresis in diameter change from a saturated condition to zero relative humidity and back. The change in diameter was 0.11 per cent per unit relative humidity and the total change in length about 1 per cent.

Carpenter and Lewis *(62)* have followed the change in structure of cellulose fibers by swelling them in cuprammonium solution. Raw-cooked fibers were covered with a lignin sheath and did not swell to any great extent. Well-cooked fibers had the lignin sheath removed and ballooning took place. The membrane forming the balloon was reported as the skin membrane of the fiber. Normally cooked and bleached pulps ballooned, showing the skin membrane was elastic. Overcooking modified the membrane in such a way as to decrease the elasticity of the membrane and inhibit swelling. Overbleaching increased the solubility of the membrane so that fibrillation, but not ballooning, occurred.

The swelling power of a mass of fibers has been measured by Kress and Bialkowsky *(48)*. Samples of pulp were compressed under a pressure of 10,000 pounds per square inch, after which the specific gravity was very close to one. Volume change was measured by the displacement of mercury when the wetting liquid was poured onto the pulp pad. Water and dilute aqueous solutions gave an increase of about 90 per cent. Young and Rowland *(63)*, using the same apparatus, found that there was a linear relation between the swelling of softwood pulps and

their pentosan content. For hardwood soda pulps the relationship was not so marked.

Hermans and de Leeuw *(64, 65)* have studied the relationship between swelling anisotropy and the deformation mechanism for regenerated xanthate fibers. In the unoriented phase the fibers show isotropic fibers, i.e., the relative change in width to length was unity. As the wet fibers were stretched so that the elementary particles oriented, the ratio of width to length change became 15 to 20 to 1. The individual particles of regenerated cellulose were thus shown to swell more in width than in length. The orientation did not take place to nearly as great an extent if the fibers were air dried.

Walker *(66)* has made interesting calculations and reviewed the literature on the swelling of cotton hairs with moisture sorption. The amount of water to give a monomolecular layer was calculated to be 0.42 per cent. Assuming that further adsorption increased the moisture layers on each fibril, he calculated that there would be 48 molecular layers at 100 per cent relative humidity. Including water to fill the lumen, the fiber could hold 143 per cent water. From this fact it appears that the total swelling, except possibly at low humidities, is not significantly dependent on the total moisture content.

Experimental Procedures

Pulp

The sprucewood was cut in November and used within two weeks of cutting. The average growth rate was 13.4 rings per inch, the density 26 pounds per cubic foot, and the moisture content 54.4 per cent. The sticks were peeled by hand and chipped in a small chipper with knives set to give 5/8-inch chips. The moisture content of the chips was 50.5 per cent.

The cooks were made in small upright stainless steel digesters equipped with circulating systems. The charge consisted of about 5,000 grams of chips on the oven-dry basis. The cooks were made from a single well-mixed sample of chips. The water ratio was maintained at 5.5. The acid contained 6.54 per cent total sulphur dioxide and 1.16 per cent combined sulphur dioxide. The cooks were gassed down from 75 to 50 pounds' pressure within 30 minutes and blown. The pulps were washed and screened through a 10-cut screen, and yield determinations were made.

The length of time at maximum temperature was the only difference in cooking conditions. Data on cooking conditions and on the properties of the pulps are given in Table I.

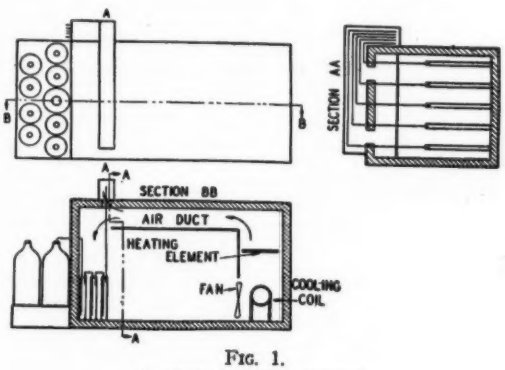

FIG. 1.
Constant Humidity Apparatus

TABLE I.—COOKING DATA AND PULP PROPERTIES

	Pulp 4	Pulp 1	Pulp 2
Cooking time, hours	9.5	10.0	11.0
Time to 110 deg. C., hours	3.0	3.0	3.0
Time to 140 deg. C., hours	4.0	4.0	4.0
Time at 140 deg. C., hours	2.5	3.0	4.0
Total yield, per cent oven-dry	52.2	51.8	50.0
Permanganate number	10.5	9.6	8.5
Bleach consumption, per cent	12.0	10.0	8.0
Lignin, per cent	0.99	0.87	0.45
Pentosans, per cent	6.8	6.7	6.3
Alcohol-benzene solubility	4.4	2.9	1.2
Cooking stain number	55.5	52.6	47.9

Constant Humidity Apparatus

An apparatus that would deliver air of constant relative humidity was desired. Saturated salt solutions were ideal for two reasons: (1) If the temperature is constant, the humidity of the air in equilibrium with the salt solution is constant as long as there is an excess of the salt present, no matter if the humidity of the incoming air is more or less than that of the leaving air. (2) The effect of temperature variation on humidity is quite small. Of the salt solutions used, the greatest change in relative humidity for 10 deg. temperature change in the range used was only 1 per cent. Temperature control of 25 ± 0.05 deg. C. gave a humidity control of 0.01 per cent.

The salt solutions were put in a temperature-controlled air bath. Sectional views of the box may be seen in Fig. 1. The cooling unit consisted of a coil of copper tubing connected to the water supply. The heating unit was connected to a thermosensitive element and relay capable of maintaining a temperature of 25 ± 0.05 deg. C. A fan was used to circulate the air past the cooling coil, heating element, thermosensitive unit, and tubes containing the salt solutions. This arrangement assured air of the proper temperature in contact with the salt solutions and gave maximum sensitivity of the unit.

The humidifying system consisted of air at 5-pound pressure led through two filters, an acid bottle of the salt solution outside the box, a similar bottle inside the box, and a series of at least three glass tubes, each 1 inch in diameter. From the last tube the humidified air was led by glass tubing through a temperature-controlled duct to the outside of the box. The air-drying series for zero humidity consisted of an acid bottle of calcium chloride, two acid bottles of sulphuric acid, and an acid bottle of phosphorous pentoxide suspended on glass wool. The usual rate of flow of air was 1 liter per hour. The relative humidity of the air from the salt solution used at 25 deg. C. was as follows: disodium hydrogen phosphate 95.0 per cent, sodium chloride 74.0 per cent, manganous chloride 58.0 per cent, technical grade magnesium chloride 36.0 per cent, and lithium chloride 12.0 per cent.

Microscopic Cell

Several features were necessary in the microscopic cell: It had to be shallow, so that the condensing system of the microscope could function; it had to be small enough to allow a rapid turnover of air, so that equilibrium could be reached in a short time; and air flow through the cell had to be uniform and positive with no pockets or "dead air" spaces. The cell used was made of 1/32-inch copper sheeting. The base of the cell was 1.5 by 3 inches with a window 1 inch square in the center. The shell was made by bending a piece of the sheeting containing a window, over which was cemented a piece of glass. The sides and the shell were soldered to the base. The

cover of the cell was a No. 2 cover glass of sufficient size. The construction is shown in Fig. 2.

In making fiber measurements the first consideration was to obtain a representative sample. After being screened, each pulp was placed in a large crock and stirred. Samples were taken from the suspension during stirring, the composite sample was stirred, and samples were taken from it for measurement. The fibers were arranged on a 1-inch square slide in a drop of water and kept in a desiccator over water. The slide to be used was placed in the cell and left overnight to come to equilibrium with 95 per cent relative humidity. Sketches of the fibers on the slide were made and the lengths measured at 100-diameter magnification. The sketches were made in pencil on a piece of paper. Widths were measured at 210-diameter magnification. Care was taken to select points on the fibers which appeared to represent an average width. After the points had been marked, all the widths were again measured to be certain that the places were adequately designated.

Fiber Treatments

Treatments of the fibers were carried out as follows: The heat treatment consisted of heating the fibers arranged on the slide in a small laboratory oven regulated at 103-5 deg. C. at the humidity of the atmosphere. The fibers were measured as usual at 95 per cent relative humidity and 25 deg. C., heated for 2 hours, measured at 0 per cent humidity and 25 deg. C., and then measured at 95 per cent relative humidity.

The bleached pulp was that obtained in the standard bleach consumption test; the brightness as measured on the General Electric reflection meter was 75.

The beating was carried out in a 1.5-pound Valley beater according to TAPPI method T 200 m. The weight on the bedplate was 5500 grams. The beater was sampled at the beating intervals, and the samples were kept at the beater consistency until used.

Results and Discussion

All the data presented were obtained at 25 deg. C. using air prehumidified to the desired humidity by passage through various saturated salt solutions. In the literature survey it was found that the effect of air on water vapor sorption was negligible; therefore, all measurements were made in humidified air. Since the history of the sample has been found to have a significant effect on the hygroscopicity of cellulosic materials, the pulps were kept at a moisture content over 50 per cent until ready for use.

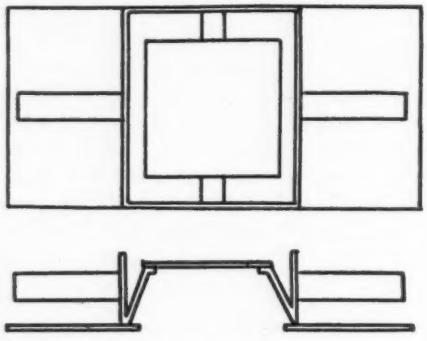

Fig. 2.
Details of the Microscope Cell

The Rate of Attainment of Equilibrium in the Microscopic Cell

When a considerable amount of water was present on the slide around the fibers, the time necessary for equilibrium with 95 per cent relative humidity was overnight in most cases. After desorption to 95 per cent, equilibrium widths were obtained within 20 minutes from the time the humidity of the air passing to the cell was changed.

The rapid attainment of equilibrium can be explained by the frequency with which the air around the fibers was changed. The total volume of the cell was about 5 cc. and the average rate of flow was 1000 cc. per hour. Thus the air in the cell was changed two hundred times an hour or three times a minute. With this rapid change of air the establishment of equilibrium was probably dependent on the fiber itself.

As the fibers were desiccated, a gradual change in their appearance could be noticed. At 95 per cent relative humidity the fibers were transparent and at times luminous; light seemingly was reflected inside the fibers. As desorption proceeded, the fibers became more opaque. On adsorption the fibers again became transparent, noticeable changes occurring from 0 to 12 and 58 to 95 per cent relative humidity.

Length and Width Measurements and Their Significance

The results of individual fiber length and width measurements at different humidities are summarized in Table II. These values are the averages of measurements made on more than two hundred fibers for each pulp. The fibers were arranged in water without previously having been allowed to dry below 50 per cent moisture; thus, the first desorption was the true primary desorption. The data are also presented in Fig. 3. It is apparent that there is a significant difference in the three unbleached pulps. The average widths for pulps 4, 1, and 2 at 95 per cent relative humidity were 0.0303, 0.0298, and 0.0388 mm., respectively. Since the probable error in the width determination was 0.0008 mm. and the difference in average widths of pulps 4 and 1 was 0.0005 mm., there is no significant difference in the fiber widths of these two pulps cooked for 9.5 and 10 hours. However, the difference in widths for pulps 4 and 2 was 0.0035 mm., more than four times the probable error and hence a significant difference. These pulps were cooked for 9.5 and 11 hours, respectively.

TABLE II.—FIBER DIMENSIONS OF THE UNBLEACHED PULPS AT DIFFERENT HUMIDITIES

R. H. Per Cent	L = Length Pulp 2	W = Width Pulp 1	Pulp 4
		First Desorption	
95 L	1.29	1.28	1.37
95 W	0.0338	0.0296	0.0303
58 W	0.0324	0.0287	0.0292
36 W	.....	.....	0.0287
12 W	0.0316	0.0279	0.0283
0 W	0.0310	0.0272	0.0277
0 L	1.27	1.26	1.35
		First Desorption	
0 W	0.0310	0.0272	0.0277
12 W	0.0314	0.0277	0.0282
36 W	.....	.....	0.0285
58 W	0.0321	0.0284	0.0289
95 W	0.0334	0.0294	0.0300
		Second Desorption	
0 W	0.0310	0.0272	0.0277
		Second Desorption	
95 W	0.0338	0.0293	0.0299

The average fiber lengths of pulps 4, 1, and 2 were 1.37, 1.29, and 1.28 mm., respectively. The probable error in length measurements was 0.05 mm.; thus, no significant difference exists.

It should be pointed out that the only strictly accurate way to compare pulp fibers is to take fibers of identical lengths and widths and measure them after cooking. As such a process is impossible, a close approximation is to compare the widths of samples of pulps having the same average fiber lengths. This procedure was followed in comparing the average fiber widths of the different pulps.

On cooking, the average fiber width of the pulps became larger. From the viewpoint of mechanics, the extremely small fiber would not be expected to become elliptical when supported on one side. Thus the effect of larger fiber width is evidently due to the cooking. Well-cooked fibers have a larger diameter, since they tend to collapse as more and more of the lignin is removed. It was observed that there was a large number of collapsed fibers on the slides of the well-cooked pulp. This explanation can be correlated with the physical properties of such a pulp. The fibers are more flexible than those of a raw-cooked pulp, and the sheets have a softer feel than those of the raw-cooked pulp. The fibers give a smoother finish because they are less capable of withstanding the flattening action of the presses and the calendar than is a raw pulp.

Hysteresis in Width Changes of the Unbleached Fibers

In Fig. 3 it can be seen that there is a definite hysteresis in fiber widths. That this hysteresis takes place might be expected from the fact that there is a hysteresis in water vapor sorption. It can also be seen that there is a definite relation between the relative humidity of the air surrounding a fiber and its dimensions.

From the shape of the curves, pulp 4, which was the rawest cook, showed the smallest hysteresis effect. It can be seen also that the fibers of this pulp exhibited the smallest permanent loss in width on desorption to dryness. On the second desorption the widths were similar to the widths on the first desorption; they were noticeably less at 95 and 58 per cent relative humidity but identical at 12 and 0 per cent. On the second adsorption the widths were almost identical with the widths on the primary adsorption.

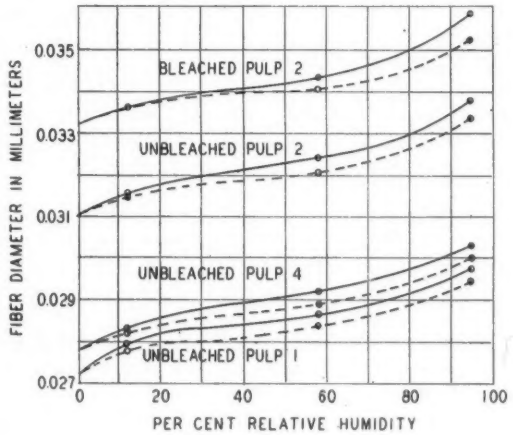

Fig. 3.
Change in Fiber Diameter with Relative Humidity.

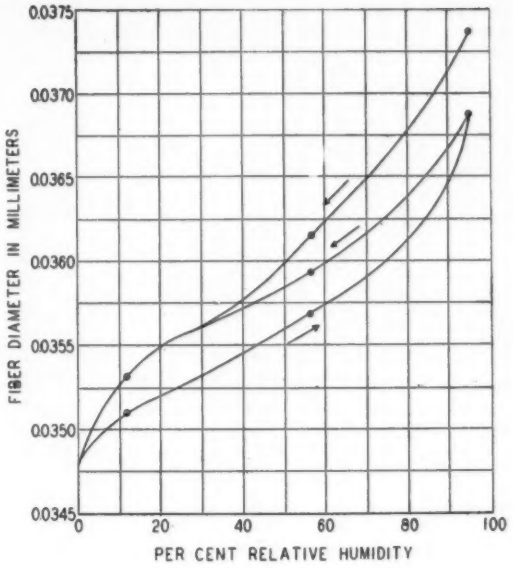

Fig. 4.
Hysteresis in Fiber Diameter Unbleached Pulp 4 Beaten.

In Fig. 4 data showing the differences in sorption curves are given for pulp 4. It is clear that there is a large difference only at high humidities. The fact that hysteresis in fiber diameter persists unchanged after the first desorption is in good agreement with the work of Seborg at the Forest Products Laboratory in Madison. Seborg showed that hysteresis in water vapor sorption persists unchanged after the primary desorption; this hysteresis indicates a relationship between the amount of water sorbed and the fiber diameter.

Fiber Length and Width Changes

Fiber dimensions were definitely connected with the relative humidity of the surrounding air in the range of 0 to 95 per cent relative humidity and at 25 deg. C. There was, however, no significant difference in the dimensional changes of the three unbleached pulps. On the primary desorption from 95 to 0 per cent relative humidity, the changes in lengths of the three pulps were 1.5 to 1.6 per cent and the changes in widths 9.0 to 9.6 per cent. On subsequent adsorption and desorption, the total changes were 0.8 per cent in lengths and 7.4 to 8.3 per cent in widths. Classification of the fibers into different width divisions demonstrated that only the fibers of 0.04-mm. diameter or more behaved differently. These larger fibers changed about 40 per cent less than fibers of smaller diameter (Table III).

TABLE III.—CHANGES IN FIBERS OF DIFFERENT DIAMETERS

	Per Cent of Change on Dry Width				
Width, mm.	1st 95-0	1st 0-95	2nd 0-95	Per Cent by No.	Av. Width
0.00-0.02	9.0	8.3	8.3	16.5	0.0156
0.02-0.03	10.7	8.9	8.4	38.4	0.0249
0.03-0.04	10.5	8.9	8.3	26.4	0.0346
0.04 up	7.6	6.2	5.7	18.9	0.0454

In general, the data available on the change in dimension of wood with humidity can be correlated with the data obtained for fibers. Wood swells 5 to 12 per cent in the tangential direction, comparable to

9 per cent in width for the free fibers, and a fraction of a per cent in the longitudinal direction, comparable to 0.8 per cent change in length for the fibers under similar humidity changes.

Since Clayton and Peirce *(60)* and Collins *(61)* have presented data on the dimensional change of cotton hairs, in Table IV the results are compared with those obtained for wood pulp fibers.

TABLE IV.—PER CENT OF CHANGE FOR A 1 PER CENT R. H. CHANGE

Fiber	Desorption		Adsorption		Per Cent R. H. Range
	Length	Width	Length	Width	
Cotton Hair (60)	....	....	0.04	0.14	0–40
Cotton Hair (61)	0.05	0.11	0.05	0.11	97–0–97
Pulp Fibers	0.016	0.09	0.008	0.08	95–0–95

The desorption figures for cotton hairs are not strictly true primary desorption data because the cotton was allowed to dry and was wetted again. In comparing adsorption data, it can be seen that the change in cotton hair width was 1.4 times greater and the change in length six times greater than the change in wood fibers. Since the agreement was qualitative for the two cotton samples and the three pulps were consistent, the difference in the two types of fibers may be attributed to structural differences.

Herman and de Leeuw *(65)* have studied the swelling anisotropy of regenerated cellulose fibers. An unoriented fiber showed isotropic swelling, i.e., the relative change of length to width was unity. As the fibers were stretched, the swelling became anisotropic and the ratio of width to length change became as large as 20 to 1. The individual particles thus showed a much greater change in width than in length and the authors advocated the use of the degree of swelling anistropy as a measure of the orientation in cellulosic materials. If this method is used for characterizing cotton and wood fibers, the ratio for the cotton hair would be 2.2 and that for the wood fibers, 10.0. Thus the elementary particles of wood fibers could be said to be oriented to the fiber axis to a greater degree than those of cotton hairs.

However, it must be remembered that a difference in physical properties, such as fibril packing, might just as well account for the relatively greater change in width with respect to length in the case of the wood fiber. If the elementary particles in a wood fiber were laid down very close together, any change in their size might be transmitted much more directly than in a cotton hair of a more open fibril structure.

The Effect of Prolonged Drying at 103-5 Deg. C. on Fiber Dimensional Changes

Slides of the fibers were measured at 95 per cent relative humidity; the fibers were then heated in the oven at 103-5 deg. C. for two hours and measured at 0 and at 95 per cent relative humidities.

The difference in swelling of the pulp dried at 25 deg. C. over phosphorous pentoxide and the same pulp dried in the oven is shown in Table V. Drying in the oven gave a larger total change on the primary desorption (11 per cent as compared to 9 per cent) and a much smaller regain on adsorption (3.6 per cent compared to 7.8 per cent). This difference may be explained in the same manner as the decrease in moisture sorption effected by drying. When a cellulose fiber dries, it shrinks and adjacent molecules are mutually satisfied. The effect of heating at a low humidity is to effect a greater shrinkage with the formation of more permanent binding. On adsorption the swelling is inhibited by these bonds. From a commercial viewpoint this is important as it shows that any drying of pulps, such as on pulp driers, will lead to a decrease in the dimensional changes of the fibers. On the other hand, such a treatment will decrease the swelling of the fibers in water and the pulp will not beat and develop strength similar to an undried pulp.

TABLE V.—EFFECT OF HEATING PULP FOR 2 HOURS AT 103 DEG. C.

	Heated at 103 deg. C.	Dried at 25 deg. C.
95 per cent R. H.		
Length	1.28	1.29
Width	0.0342	0.0338
0 per cent R. H.		
Length	1.27	1.28
Width	0.0308	0.0310
95 per cent R. H.		
Width	0.0319	0.0334
Per cent of Change		
95-0	11.0	9.0
0-95	3.6	7.8

The Effect of Beating on Fiber Diameter and Length Changes With Changing Humidity

Pulp 4, the rawest pulp, was chosen for this experiment. Average fiber lengths before and after beating were 1.37 and 0.96 and average widths were 0.0303 and 0.0374, respectively, at 95 per cent relative humidity. The effect of beating was to decrease the average fiber length by cutting action and to increase the average fiber diameter by cutting the relatively long and wide fibers. The pulp was beaten to a Schopper-Riegler freeness of 650.

Since the average fiber length of the pulp was changed by beating, the unbeaten and the beaten pulps were compared on a percentage basis. The data are given in Table VI. It is seen that the effect of beating was to cause an appreciable decrease in the change in width of the fibers with humidity. The total changes were uniformly 2 per cent less for the beaten pulp. For the first desorption the total changes based on the width at zero humidity were: Unbeaten pulp 9.4 per cent, beaten pulp 7.5 per cent; on the first adsorption: unbeaten pulp 8.3 per cent, beaten pulp 6.0 per cent; and on the second adsorption: unbeaten pulp 7.9 per cent, beaten pulp 6.0 per cent.

TABLE VI.—UNBEATEN AND BEATEN PULP 4, PER CENT OF CHANGE IN WIDTH

Numbers 1 to 7, per cent of change based on the preceding width.
Numbers 8 and 9, per cent of change based on the starting width.
Number 10, per cent of change based on the width at 95 per cent R. H. after 1 cycle.
Number 11, per cent of change based on the width at 0 per cent R. H.

	Per Cent R. H.	Width Change	
		Unbeaten Per cent	Beaten Per cent
1.	95–58	3.6	3.2
2.	58–12	3.1	2.5
3.	12–0	2.1	1.4
4.	0	0	0
5.	0–12	1.9	0.9
6.	12–58	2.5	1.7
7.	58–95	3.8	3.4
8. After 1 Cycle	95	1.0	1.4
9. After 2 Cycles	95	1.3	1.4
10. In 2nd Cycle	95	0.3	0.0
11. Total Changes			
1st	95–0	9.4	7.5
1st	0–95	8.3	6.0
2nd	0–95	7.9	6.0

In Table VII the width changes may be compared for fibers classified according to width. Although the fibers having the larger diameters were affected to a greater extent, there was a difference at all widths, showing that beating has a definite effect on the fibers. The per cent by number indicates that the increase in average width with beating was due to an increase in number of fibers of large diameter.

TABLE VII.—PER CENT CHANGE IN WIDTH OF FIBERS OF VARIOUS CLASSIFICATIONS OF PULP 4

U = Unbeaten Pulp B = Beaten Pulp

mm.	1st 95-0 R.H. U	1st 95-0 R.H. B	1st 0-95 R.H. U	1st 0-95 R.H. B	2nd 0-95 R.H. U	2nd 0-95 R.H. B
0.00-0.02	10.1	8.7	10.1	8.7	10.1	8.7
0.02-0.03	9.5	10.1	8.6	8.4	8.1	8.4
0.03-0.04	9.7	8.7	8.4	7.2	8.1	7.2
0.04-0.05	8.6	6.0	7.4	4.3	7.1	4.3
0.05 up	9.1	6.1	7.7	4.8	6.7	4.8

mm.	Average Width U	Average Width B	Per Cent by Number U	Per Cent by Number B
0.00-0.02	0.0142	0.0163	18.2	8.8
0.02-0.03	0.0242	0.0250	30.8	20.6
0.03-0.04	0.0340	0.0348	29.8	26.0
0.04-0.05	0.0442	0.0445	13.4	27.0
0.05 up	0.0539	0.0553	7.8	17.6

An explanation of this decrease in swelling must lie in a mechanical action of the beater. Beating may loosen the internal structure of the fiber, i.e., the fibrillar structure, so that moisture is adsorbed into the voids; the effect is to decrease the over-all expansion.

The Effect of Bleaching

A sample of pulp 2 was used because it had the lowest bleach consumption. The pulp was bleached by the usual bleach consumption method, a single stage hypochlorite bleach at 35 deg. C., using 8 per cent hypochlorite. The brightness of the pulp measured on the General Electric reflection meter was 75 per cent.

The average fiber width of the bleached pulp was 0.0359 mm., as compared with 0.0338 mm. for the unbleached pulp. The effect of cooking for 1 hour longer was to increase the average width from 0.0303 mm. to 0.0338 mm. Both these increases in width are significant increases. The actions of cooking and bleaching are somewhat analogous in that they both remove lignin. The effect of increased average width may thus be caused by the removal of lignin. As lignin removal proceeds, the fiber tends partially to collapse and become elliptical.

The effect of bleaching was even more noticeable in the decrease in the change in width with humidity change. In this case, again, percentages of change were compared. The actual differences in total change were: first desorption, unbleached pulp 9.0 per cent, bleached pulp 8.1 per cent; first adsorption, unbleached pulp 7.8 per cent, bleached pulp 6.0 per cent; second adsorption, unbleached pulp 7.4 per cent, bleached pulp 5.4 per cent.

As in the case of beating, the greatest effect was in the decrease in the width on the first adsorption. The effect of the various treatments on the change during adsorption may be compared by the use of the ratio of the per cent change in the unbleached pulp and the per cent change in the treated pulps. Comparable ratios for the various treatments were: beating to 650 freeness, ratio 1.25; bleaching with 8 per cent hypochlorite, 1.30; oven heating for 2 hours at 103 deg. C., 2.16. The effects of beating and bleaching were quite similar and were small as compared to the effect of heat treatment.

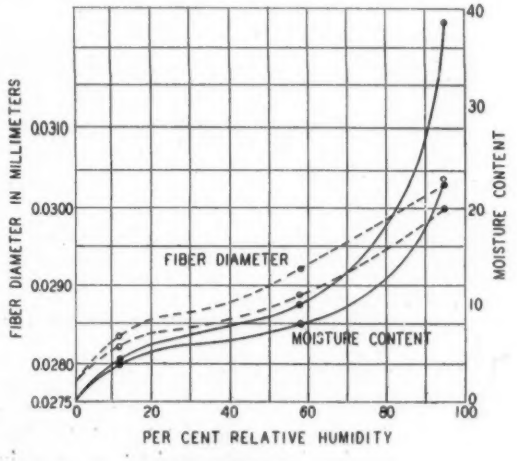

FIG. 5.
Fiber Diameter—Moisture Content Unbleached Pulp 4.

The Relationship Between Moisture Sorption and Change in Fiber Dimensions

Moisture contents of the three unbleached pulps were determined by the use of a salt solution desiccator method. On the primary desorption the moisture contents at 95 per cent relative humidity were 38.8 to 41.1 per cent. The high moisture contents were due to the use of green wood (with a moisture content of over 50 per cent) and to the fact that the pulps were not allowed to dry to a low moisture content until the primary desorption. On adsorption after drying the values obtained agreed with the values obtained by other investigators. The pulps all showed a hysteresis in moisture sorption (Table VIII).

TABLE VIII.—EQUILIBRIUM MOISTURE CONTENTS OF THE UNBLEACHED PULPS

Per Cent R.H.	Pulp 4	Pulp 1	Pulp 2	Pulp 2 (oven-dry)
	First Desorption			
95	38.8	40.0	41.1	41.1
58	10.0	9.5	9.0	....
12	4.9	4.5	4.2	....
	First Adsorption			
12	4.6	4.3	4.0	....
58	7.9	7.6	7.3	....
95	23.3	23.9	24.4	22.6

The moisture content and change in fiber diameter of pulp 4 are compared in Fig. 5. From 0 to 36 per cent relative humidity and 0 to 5-7 per cent moisture content the correlation between moisture content and fiber diameter is very good. From 36 to 60 per cent relative humidity the correlation is fair, but above this point there seems to be no correlation. Above 60 per cent relative humidity the fiber diameter increases very rapidly. The very small change in fiber diameter between 95 per cent relative humidity and saturation may also be seen. The differences in diameter between fibers at 95 per cent relative humidity and fibers in water are negligible. The great increase in moisture content above 60 per cent relative humidity and the small increase in fiber diameter indicate that there is some method of holding water in addition to that which affects the swelling of the fiber.

Summary and Conclusions

A method and apparatus for observing the changes in fiber dimensions with varying relative humidity at 25 deg. C. have been developed. By the use of this technique the effect of various treatments on the dimensional changes of individual fibers at different relative humidities was measured.

Three sulphite pulps were prepared from a single well-mixed sample of chips from green sprucewood. The cooks were made under identical conditions except that the time at maximum temperature was varied (2.5, 3, and 4 hours); the total cooking times were 9.5, 10, and 11 hours. The pulps produced had

bleach consumptions of 8, 10, and 12 per cent, respectively.

Samples of the pulps were oven dried, bleached, and processed in a beater, and their dimensional changes were observed.

Moisture contents of the pulps were determined at the relative humidities used for fiber measurements.

From the data the following conclusions may be drawn:

1. Fiber dimensions are definitely dependent on the relative humidity of the surrounding air from 0 to 95 per cent relative humidity at 25 deg. C.

2. The dimensions of fibers in water and at equilibrium with 95 per cent relative humidity are not appreciably different.

3. Hysteresis in fiber widths and moisture content exists for the pulps. After the original desorption, hysteresis in fiber widths persists unchanged in the range of 0 to 95 per cent relative humidity.

4. The total per cent change in dimensions of the unbleached fibers in the range of 0 to 95 per cent relative humidity are: first desorption, length 1.5 to 1.6 per cent, width 9.0 to 9.6 per cent; subsequent adsorption and desorption, length 0.8 per cent, width 7.4 to 8.3 per cent.

5. The ratio of the change in fiber width to length is of the same order of magnitude as the ratio of the changes in the cross and machine direction in machine-made papers.

6. Pulps cooked 9.5 and 10 hours have approximately the same average fiber diameters, but pulp cooked for 11 hours has a significantly larger average width at all humidities. Bleached pulp has a larger average width than unbleached pulp.

7. Dimensional changes for three sulphite pulps cooked to different degrees are not significantly different.

8. Prolonged drying of the fibers at 103 deg. C. decreases the swelling of the fiber on adsorption by 50 per cent.

9. Beating to a freeness of 650 decreases the total swelling of the fibers on adsorption 25 per cent.

10. Bleaching with 8 per cent hypochlorite decreases the swelling by roughly the same amount as beating.

11. If the total change in width on adsorption of the unbleached pulp is taken as a measure of the relative effect of the treatment, the differences in the treatments are: beating to 650 freeness, 1.25; bleaching with 8 per cent hypochlorite, ratio 1.30; and drying at a high temperature, ratio 2.16.

12. Moisture contents of unbleached pulps on the first desorption to 95 per cent relative humidity are 38.8 to 41.1 per cent and on adsorption to the same humidity after drying, 23.3 to 24.4 per cent.

13. The correlation between moisture content and fiber diameter is very good to 36 per cent relative humidity and to 5 to 8 per cent moisture. Above this range the moisture content increases more rapidly than fiber swelling.

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Richard S. Testut Goes to Chester

Boston, Mass., January 2, 1939.—Richard S. Testut, who has been at the Boston office of the Scott Paper Company, has been promoted to an executive position in the industrial department at the plant of the company in Chester, Pa.

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Drying

Dewatering of Groundwood Pulp. Wochbl. Papierfabr. 69, no. 8: 160; no. 11: 241; no. 12: 262 (Feb. 19, March 12, 19, 1938); B. I. P. C. 8: 341.—A groundwood mill plans to increase its output to 60-70 tons pulp at 50 per cent moisture which is sold in laps or bales. Economic dewatering machines are sought; ordinary wet machines or Kamyr machines do not seem appropriate. The pulp leaves the fine screen in a dilution of 1:300. Three of the four answers received recommend multipress wet machines with somewhat varying arrangements, delivering the pulp in rolls for shipment. The fourth answer considers this method not economical, especially since ordinary wet machines do not dewater to 50 per cent, so that hydraulic presses have to be added. The most appropriate dewatering machine for the given conditions seems to be the Kamyr machine; space requirements and attendance are less than for wet machines; initial cost and power consumption are approximately the same; felt consumption is less; eventually no felts at all are needed.—C.J.W.

Method and Apparatus for Drying Cellulose in a Continuous Web. Sven Wellmar. U. S. pat. 2,101,301, (Dec. 7, 1937).—The web is conveyed through the drying apparatus in a number of substantially vertical coils and is intensively swept by warm air on both sides, and at the same is subjected to direct heat radiation on both sides from heating elements placed inside the drier. (C1.34-48).—A.P.-C.

Vertical Drier. Charles A. Dickhaut and Sterling W. Warner, assignors to John Waldron Corp. U. S. pat. 2,103,110, (Dec. 21, 1937).—The invention provides a drying chamber through which a coated paper web is carried in a vertical position by being held along one edge. Various mechanical features are provided for holding the paper and for transferring it from one carrier to the other. (Cl. 34-48)—A.P.-C.

Varnish and Paper Drying Machine. Maxime J. Brizard. U. S. pat. 2,106,339, Jan. 25, 1938.—Various mechanical features in the construction of apparatus for drying varnished paper labels by the combined action of air currents and suction. (C1.34-12)—A.P.-C.

Highly Reflecting Coating. John D. McBurney and Edgar H. Nollau. U. S. pat. 2,087,094, (July 13, 1937) assigned to E. I. du Pont de Nemours and Co.). Can. pat. 361,667, (Nov. 10, 1936) (assigned to Canadian Industries, Ltd.).—An article with a mirror-like surface is prepared by depositing on a paper base 0.4 to 2.0 oz. per sq. yd. of a composition containing 43.8 per cent of polyhydric alcohol-polybasic acid resin modified by tung and linseed oils, 53.5 per cent of a mixture of mineral thinner and high-flash naphtha and the remainder consisting of drier solution; passing the paper through a 72-foot drying chamber at 180° to 200°F. at a speed of 5 yds. per min.; distributing over the coating a metal powder of which the individual particles have light-reflecting faces; removing non-adherent particles; orienting the adhering particles to bring the light-reflecting faces into the plane of the surface of the coating to form a metallic finish of mirror-like reflectivity, and heating to harden the coating. (C1. 91-70)—A.P.-C.

Coating Casting Machine. Lynn B. Case, assignor to John Waldron Corporation. U. S. Pat. 2,086,117, (July 6, 1937).—The invention relates to coating machines for casting a coating compound blended with high, medium or low boiling solvents such as varnishes, lacquers, etc., onto base materials such as paper, etc. The construction is such as to maintain a high saturation of volatile solvents in the air surrounding the coating rolls so as to prevent drying of the lacquer. The movement of the paper may be stopped without stopping the rotation of the coating rolls. Means are provided for varying the width of application of the coating on the web of paper, and for accurately adjusting the rolls relatively to one another. (C1.91-49).—A.P.-C.

Decalcomania Paper. Lewis Davis, assignor to McLaurin-Jones Company. U. S. pat. 2,104,025, (Jan. 4, 1938).—A backing sheet of paper that is readily penetrable by the releasing solvent, carries on one face two superposed coats of waterproof material. The upper or outer coat has a smooth uniform surface adapted to take decalcomania printing, while the under coat acts both as a sizing to prevent the penetration of the upper coating material into the backing sheet during the manufacturing operations, and serves also to bond the outer coat to the backing sheet. Preferably the under coat is made with rubber latex and the outer coat of Cumar resin. (C1.41-33).—A.P.-C.

Method of Applying Films Made from Viscose to Paper and the Like. Clyde Scott. U. S. pat. 2,104,057, (Jan. 4, 1938).—A viscose film is made to adhere to paper or the like by applying to one or both sides of the viscose film a coating of a lacquer solution formed of low viscosity nitrocellulose to which has been added polymerized linseed oil in amount approximately equal to the quantity of the dry weight of the cellulose, together with a suitable plasticizer and a small amount of gum chicle or the like. (C1.154-40).—A.P.-C.

Gummed Tape. Arthur Bennett. U. S. pat. 2,109,583, (March 1, 1938).—A gummed paper tape is coated on one side with a moisture-activatable glue the same width as the tape and on the other side with a narrower layer of pressure-sensitive glue covered with a strip of Holland cloth wider than the layer of pressure-sensitive glue but narrower than the full width of the paper tape. Rubber, benzene and rosin oil may be used as a tacky adhesive. (Cl. 154-43).—A.P.-C.

Decalcomania. Ferdinand W. Humphner assignor to Mid-States Gummed Paper Co. U. S. pat. 2,100,140, (Nov. 23, 1937).—A paper base is used carrying a water-soluble adhesive containing glycerol and a vegetable wax such as japan wax with a transfer body on the adhesive and a steel engraving print on the top of the transfer body. (C1.41-33)—A.P.-C.

Coated Paper and Paper-Coating Compositions. James K. Hunt and George A. Latham, assignors to E. I. du Pont de Nemours & Co. U. S. pat. 2,102,207. (Dec. 14, 1937).—Paper is coated with a composition comprising mixed alkyl ethers of cellulose containing lower alkyl radicals, e.g., methyl and ethyl, and higher aliphatic hydrocarbon radicals. (C1.91-68).—A.P.-C.

Pulp Purification

Machine for Disintegrating, Screening and Pumping Fibrous or Paper Making Stocks. William T. Doyle and Thomas J. Sturtevant, assignors to Sturtevant Mill Co. U. S. pat. 2,103,896, (Dec. 28, 1937).—The invention provides a small and relatively inexpensive machine which is operable with low power consumption and which, although partaking of the character of a centrifugal pump, is equipped with stock-propelling blades designed to disintegrate or defiberize the stock as it is being progressively fed into and discharged from the machine and also with an impedance at its discharge section in the form of a slotted or perforated plate designed to permit only a properly disintegrated or defiberized portion of the stock to be discharged. The discharge is effected under sufficient residual pressure to permit transfer of the disintegrated stock to an overhead beater or other destination so located relative to the machine as to require no positive or pumping pressure. (C1.92-20).—A.P.-C.

Treatment of Pulp to Suit it for Acetylation. Arthur N. Parrett and Judson H. Holloway, assignors to Rainier Pulp and Paper Co. U. S. pat. 2,105,498 (Jan. 18. 1938).—High alpha pulp sheets as shipped or manufactured are wetted with water or water vapor so that the moisture content lies between 12 and 30%. The pulp is then shredded and dried at a temperature below 35°C. before subjecting to acetylation. (C1.260-101).—A.P.-C.

Pawtucket Paper Firms Move

PAWTUCKET, R. I., January 2, 1939.—The Industrial Paper and Cordage Company and the Shaw Paper Box Company have removed from 48 Broadway to one of the buildings of the old Royal Weaving Company, at Freight street and Central avenue.

To Operate Mill at Freeland

Charles Fager & Son, who recently purchased the mill of Darby & Co., at Freeland, Md., will continue to manufacture furniture bogus, the same line that was made by Darby & Co. for a long number of years.

Green Fuel Economizer Changes

The Green Fuel Economizer Company, Inc., Beacon, N. Y., announces the election of John M. Birkenstock as vice-president and general manager, effective January 1, 1939. Mr. Birkenstock, a graduate of Stevens Institute of Technology in the class of 1913, has been associated with the company as a sales engineer since 1924. He was previously employed by The Babcock & Wilcox Company.

Clinton S. Messler, vice-president and chief engineer, takes charge of production. Mr. Messler has been chief engineer of the company since 1917 and is a graduate of Worcester Polytechnic Institute, class of 1903.

Native Lignin

By F. E. Brauns [1]

The author has recently succeeded in isolating from black spruce by organic solvent extraction, but without the use of any acidic or basic reagent, a part of the lignin in its unchanged or native form. It is a light cream, almost white powder, soluble in dilute sodium hydroxide solution and certain organic solvents such as methanol.

With phloroglucinol-hydrochloric acid solution the lignin gives a bright purple coloration, and with phenol and hydrochloric acid a bluish green coloration, as already described for coniferous woods.

This native lignin is partially methylated with diazomethane and also with methanol and hydrochloric acid. With phenol in the presence of a trace of hydrochloric acid as a catalyst it forms only an ether-insoluble phenol lignin. With thioglycolic acid in the presence of hydrochloric acid in dioxane solution, a thioglycolic acid lignin is obtained which seems to be identical with the tetra-thioglycolic acid spruce lignin as described by Holmberg.

With phenylhydrazine a hydrazone is formed, indicating the presence of one carbonyl group in native lignin on the basis of a molecular weight of about 850 for the lignin building unit.

Although this isolated native lignin represents only a relatively small percentage of the total lignin in sprucewood, it appears to have the same chemical structure and properties as the total lignin. This can be seen from the table, as the methoxyl contents of the various lignin derivatives of the isolated native lignin compare very well with the corresponding lignin derivatives obtained from sprucewood directly and in much higher yield—in the case of the phenol and thioglycolic acid lignin derivatives, actually in quantitative yield.

The methoxyl contents of these various compounds are given in the following table and are compared with the corresponding lignin compounds prepared directly from sprucewood.

Lignin Derivative	Isolated from Native Lignin MeO, Per cent	Isolated from Sprucewood MeO, Per cent
Diazomethane-methylated product	21.5	21.3 [a]
Methanol derivative	21.5	21.6 [b]
Phenol derivative	10.6	10.4 [c]
Thioglycolic acid derivative	10.6	10.6 [d]

[a] Brauns and Hibbert, *Can. J. Research*, B 13:78 (1935).
[b] Brauns and Hibbert, *Can. J. Research*, B 13:28 (1935).
[c] Brauns and Hibbert, *Can. J. Research*, B 13:61 (1935).
[d] Holmberg, B., *Papier Fabr.* 36:218 (1938).

On heating native lignin with sodium bisulphite solution (1 per cent Na_2O and 4.5 per cent total SO_2) at 125 degrees, it completely dissolves with the formation of lignin sulphonic acid.

All these compounds are being investigated further, and the results will be reported in detail at an early date.

[1] The Institute of Paper Chemistry, Appleton, Wis.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING DECEMBER 31, 1938

SUMMARY

Cigarette paper	369 cs.
Wall paper	3 cs.
Wall board	422 bdls.
Newsprint	3,226 rolls
Printing paper	151 rolls, 31 cs.
Packing paper	16 rolls
Drawing paper	29 cs.
Filter paper	1 ble., 15 cs.
Filter Compound	150 bls.
Filter mass	100 bls.
Surface baryta coated paper	51 crates, 8 cs.
Surface coated paper	1 crate, 42 cs.
Basic paper	56 cs.
Photo paper	23 cs.
Decalcomania paper	27 drums
Tissue paper	33 cs.
Tin lined paper	2 cs.
Colored paper	1 cs.
Gummed paper	2 cs.
Paper tubes	137 cs.
Miscellaneous paper	142 cs.

CIGARETTE PAPER

Champagne Paper Corp., *American Banker,* Havre, 50 cs.
H. H. Straus, *Schodack,* Bordeaux, 136 cs.
American Tobacco Co., *Schodack,* Bordeaux, 183 cs.

WALL PAPER

A. W. Fenton Co., Inc., *American Banker,* London, 2 cs.

WALL BOARD

Blanchard Lumber Co., Vingaren, Gothenburg, 422 bdls.

NEWSPRINT

Jay Madden Corp., *Mormactide,* Kotka, 732 rolls.
H. Reeve Angel & Co., Inc., *Mormactide,* Kotka, 37 rolls.
Walker Goulard Plehn Co., *Mormactide,* Kotka, 97 bls.
Perkins Goodwin & Co., *Deutschland,* Hamburg, 120 rolls.
Lunham & Reeve, Inc., *Vingaren,* Kotka, 165 rolls.
N. Y. Evening Journal, *Vingaren,* Kotka, 905 rolls.
Clinton Paper Corp., *Vingaren,* Gothenburg, 63 rolls.
Gilman Paper Co., *Vingaren,* Gothenburg, 381 rolls.
Parsons & Whittemore, Inc., *Sorvard,* Sundsvall, 73 rolls.
Nolan & Bowmall Co., Inc., *Sorvard,* Sundsvall, 15 rolls.
H. Reeve Angel & Co., Inc., *Scanstates,* Kotka, 35 rolls.
Perkins Goodwin & Co., *Hamburg,* Hamburg, 402 rolls.
Jay Madden Corp., *Hamburg,* Finland, 201 rolls.

PRINTING PAPER

H. Reeve Angel & Co., Inc., *Vingaren,* Kotka, 69 rolls.
Dingelstedt & Co., *Hamburg,* Bremen, 18 cs., 82 rolls.
Steiner Paper Corp., *Hamburg,* Bremen, 13 cs.

PACKING PAPER

Rohner Gehrig & Co., *Deutschland,* Hamburg, 16 rolls.

DRAWING PAPER

Japan Paper Co., *American Banker,* London, 2 cs.
——, *Aquitania,* Southampton, 1 cs.
Keuffel & Esser Co., Inc., *Hamburg,* Hamburg, 26 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *Alaunia,* London, 1 cs.
C. Schleicher & Schull Co., Inc., *Deutschland,* Hamburg, 14 cs., 1 ble.

FILTER COMPOUND

Mager Bros., Inc., *Deutschland,* Hamburg, 150 bls.

FILTER MASS

A. W. Fenton Co., Inc., *Hamburg,* Bremen, 100 bls

SURFACE BARYTA COATED PAPER

Atlantic F'd'g Co., *Deutschland,* Hamburg, 8 cs.
Globe Shipping Co., *Hamburg,* Bremen, 51 crates.

SURFACE COATED PAPER

Heinrich & Winterling, *Deutschland,* Hamburg, 1 crate.
Gevaert Co. of America, *Black Eagle,* Antwerp, 42 cs.

BASIC PAPER

Globe Shipping Co., *Deutschland,* Hamburg, 50 cs.
Globe Shipping Co., *Hamburg,* Bremen, 6 cs.

PHOTO PAPER

Medo Photo-Supply Co., *American Banker,* London, 4 cs.
——, *American Banker,* London, 12 cs., (raw base).
J. J. Gavin & Co., *Aquitania,* Southampton, 4 cs.
Heemsoth Kerner Corp., *Deutschland,* Hamburg, 3 cs.

DECALCOMANIAS

Sellers Transportation Co., *Deutschland,* Hamburg, 28 cs.
Sellers Transportation Co., *Hamburg,* Hamburg, 4 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *American Shipper,* Liverpool, 27 drums, (duplex).

TISSUE PAPER

W. J. Byrnes & Co., *Aquitania,* Southampton, 2 cs.
Atlantic F'd'g Co., *Deutschland,* Hamburg, 9 cs.
Corn Exchange Bank Trust Co., *Kiyokawa Maru,* Kobe, 22 cs.

TIN LINED PAPER

Patino Mines & Enterprises, Inc., *Aquitania,* Southampton, 2 cs.

COLORED PAPER

D. C. Andrews & Co., *Hamburg,* Bremen, 1 cs.

GUMMED PAPER

Heemsoth Kerner Corp., *Hamburg,* Bremen, 2 cs.

PAPER TUBES

——, *Deutschland,* Hamburg, 137 cs.

MISCELLANEOUS PAPER

Japan Paper Co., *Yamakaze Maru,* Kobe, 87 cs.
Remington Rand, Inc., *Yamakaze Maru,* Kobe, 10 cs.
E. H. Sargent & Co., *Vingaren,* Gothenburg, 12 cs.
Japan Paper Co., *Aobasan Maru,* Kobe, 28 cs.
E. Dietzgen & Co., *Estrella,* Marseilles, 5 cs.

RAGS, BAGGINGS, ETC.

Manufacturers Trust Co., *Samaria,* Liverpool, 42 bls. rags.
J. Cohen & Son Co., Inc., *Samaria,* Liverpool, 16 bls. paper stock.
E. Butterworth & Co., Inc., *American Banker,* London, 46 bls. old twines.
Irving Trust Co., *Schodack,* Havre, 52 bls. old waste sisal, 74 bls. bagging.
R. Blank, *Schodack,* St. Nazaire, 235 bls. rags.
——, *Deutschland,* Hamburg, 117 bls. bagging.
Hudson F'd'g & Shipping Co., *Estrella,* Marseilles, 11 bags old paper.
Richard Shipping Co., *Tonsbergfjord,* Antwerp, 39 bls. rags.
——, *Tonsbergfjord,* Antwerp, 100 bls. rags.
W. Steck & Co., *Tonsbergfjord,* London, 139 bls. waste string.
——, *American Shipper,* Manchester, 44 bls. paper stock.
National City Bank, *American Shipper,* Manchester, 80 bls. rags.
E. J. Keller Co., Inc., *Nordvest,* ——, 57 bls. rags.
D. S. Stern Corp., *Nordvest,* Bombay, 700 bls. cotton waste.
Castle & Overton, Inc., *Nordvest,* Bombay, 575 bls. jute rags, 88 bls. cotton rags.
W. J. Green Co., *Nordvest,* Bombay, 29 bls. canvas rags.
Darmstadt Scott & Courtney, *Nordvest,* Bombay, 142 bls. jute rags.

HIDE CUTTINGS

——, *American Shipper,* Liverpool, 350 bags.

OLD ROPE

National City Bank, *American Banker,* London, 59 coils.
Chase National Bank, *American Banker,* London, 147 coils.
W. Steck & Co., *Tonsbergfjord,* London, 72 bls. 63 coils.
D. Benedetto, Inc., *Scanstates,* Helsingfors, 76 bls.

WOOD PULP

Pulp Sales Corp., *Mormactide,* Wiborg, 550 bls. mechanically ground pulp, 108 tons, 2,540 bls. sulphite, 485 tons; 381 bls. sulphate, 76 tons.
Pulp Sales Corp., *Mormactide,* Kotka, 1,040 bls. mechanically ground pulp, 208 tons.
——, *Deutschland,* Hamburg, 374 bls. wood pulp, 56 tons.
Parsons & Whittemore, Inc., *Deutschland,* Hamburg, 333 bls. wood pulp, 50 tons.
Bank of N. Y. Trust Co., *Deutschland,* Hamburg, 615 bls. wood pulp, 123 tons.
Pulp Sales Corp., *Vingaren,* Viipuri, 2,540 bls. sulphate.
J. Andersen & Co., *Vingaren,* Gothenburg, 430 bls. sulphite.
D. M. Hicks, Inc., *Vingaren,* Gothenburg, 462 bls. sulphite.
Cellulose Sales Co., *Sorvard,* Sundswall, 8,850 bls. sulphite, 1,755 tons.
Perkins Goodwin & Co., *Sorvard,* Sundsvall, 17,568 bls. kraft sulphate, 2,928 tons.
Pulp Sales Corp., *Scanstates,* Kotka, 702 bls. mechanically ground pulp, 40 tons. 170 bls. sulphite, 28 tons.
Bulkley Dunton Pulp Co., Inc., *Scanstates,* ——, 1,800 bls. sulphite, 304 tons.
W. Bersch, *Hamburg,* Bremen, 80 bls. wood pulp.
M. Sone, *Pilsudski,* Gdynia, 165 bls. wood pulp.
M. Sone, *Birmania,* Trieste, 1,040 bls. wood pulp.

WOOD PULP BOARDS

Jay Madden Corp., *Mormactide,* Kotka, 255 rolls, 92 tons.
——, *Deutschland,* Hamburg, 100 cases.
——, *Vingaren,* Viipuri, 232 rolls.
Jay Madden Corp., *Vingaren,* Viipuri, 166 bls.
H. Fuchs & Son, *Vingaren,* Gothenburg, 59 crates.
Jay Madden Corp., *Vingaren,* Kotka, 77 rolls, 339 bls.

ALBANY IMPORTS

WEEK ENDING DECEMBER 31, 1938

Brown Bros., Harriman & Co., Inc., *Sorvard,* Hernosand, 2,490 bls. sulphate, 415 tons.
Tradesmans National Bank Trust Co., *Sorvard,* Norrsundet, 6,750 bls. sulphate.

PORTLAND IMPORTS

WEEK ENDING DECEMBER 31, 1938

Parsons & Whittemore, Inc., *Waukegan,* ——, 667 bls. woodpulp.
Pagel Horton & Co., Inc., *Consul Olsson,* Sweden, 13,972 bls. wood pulp.
Gottesman & Co., Inc., *Consul Olsson,* Sweden, 3,000 bls. wood pulp.
Gottesman & Co., Inc., *Hallaren,* Sweden, 2,540 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING DECEMBER 31, 1938

Castle & Overton, Inc., *Schodack,* Havre, 193 bls. rags.
E. J. Keller Co., Inc., *Schodack,* ——, 781 bls. rags.
Pagel Horton & Co., Inc., *Brosund,* Sweden, 1,844 bls. wood pulp.
Price & Pierce, Ltd., *Lagaholm,* ——, 1,560 bls. bleached sulphite.
Price & Pierce, Ltd., *Toronto,* ——, 750 bls. bleached sulphite.
Gottesman & Co., Inc., *Brosund,* Sweden, 4,500 bls. wood pulp.
Gottesman & Co., Inc., *Frode,* Sweden, 6,875 bls. wood pulp.

NEW LONDON IMPORTS

WEEK ENDING DECEMBER 31, 1938

Price & Pierce, Ltd., *Bockenheim,* ——, 3,000 bls. unbleached sulphite.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 31, 1938

E. J. Keller Co., Inc., *Schodack,* ——, 198 bls. rags.
——, *Mormactide,* Stockholm, 90 bls. sulphite, 15 tons.
Gottesman & Co., Inc., *Mormactide,* Stockholm, 1,000 bls. sulphite, 101 tons.
Pulp Sales Corp., *Mormactide,* Wiborg, 1,625 bls. sulphite, 308 tons.
Pulp Sales Corp., *Mormactide,* Kotka, 210 bls. sulphite, 42 tons.
J. W. Hampton Jr., & Co., *Mormactide,* Kotka, 128 rolls newsprint.
Jay Madden Corp., *Mormactide,* Kotka, 200 bls. wood pulp boards, 30 tons.
Pulp Sales Corp., *Vingaren,* Viipuri, 1,016 bls. sulphite.
Wilkinson Bros., & Co., Inc., *Vingaren,* Kotka, 80 rolls newsprint.
Public Ledger, Inc., *Vingaren,* Kotka, 357 rolls newsprint.
Jay Madden Corp., *Vingaren,* Kotka, 434 bls. wood pulp boards.
J. W. Hampton Jr., & Co., *Vingaren,* Kotka, 88 rolls newsprint.
Johaneson Wales & Sparre, Inc., *Vingaren,* Gothenburg, 700 bls. sulphate.
The Borregaard Co., Inc., *Vingaren,* Gothenburg, 245 rolls, 5 bls. paper.
E. J. Keller Co., Inc., *Black Eagle,* ——, 139 bls. bagging, 153 bls. rags.
Philadelphia National Bank, *Nordvest,* Bombay, 96 bls. rags.
O'Neil Bros., *Nordvest,* Bombay, 50 bls. cotton waste.
Price & Pierce, Ltd., *Bockenheim,* ——, 1,200 bls. unbleached sulphite, 360 bls. unbleached kraft pulp, 600 bls. unbleached mechanical pulp.
Gottesman & Co., Inc., *Scanpenn,* Sweden, 1,500 bls. wood pulp.

WILMINGTON IMPORTS

WEEK ENDING DECEMBER 31, 1938

Pulp Sales Corp., *Mormactide,* Wiborg, 6,162 bls. sulphite, 1,232 tons.
Castle & Overton, Inc., *Mormactide,* Wiborg, 4,641 bls. wood pulp, 928 tons.
Parsons & Whittemore, Inc., *Bockenheim,* ——, 11,100 bls. unbleached sulphite.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 31, 1938

Congoleum Nairn Co., *Schodack,* Havre, 2,277 bls. rags.
Congoleum Nairn Co., *Schodack,* St. Nazaire, 319 bls. rags.
Congoleum Nairn Co., *Schodack,* Bordeaux, 829 bls. rags.
——, *Schodack,* Bordeaux, 42 bls. rags.
Congoleum Nairn Co., *Estrella,* Marseilles, 798 bls. rags.
Pagel Horton & Co., Inc., *Blankaholm,* Sweden, 6,000 bls. wood pulp.
Pagel Horton & Co., Inc., *Heddernheim,* ——, 4,875 bls. wood pulp.
Pulp Sales Corp., *Vingaren,* Viipuri, 1,981 bls. sulphate.
Jay Madden Corp., *Vingaren,* Viipuri, 70 bls. wood pulp boards.
H. Reeve Angel & Co., Inc., *Vingaren,* Kotka, 170 bls. newsprint.
Jay Madden Corp., *Vingaren,* Kotka, 1,420 rolls newsprint.
——, *Vingaren,* Gothenburg, 269 bdls. wall board.
The Borregaard Co., Inc., *Vingaren,* Gothenburg, 1,325 bls. wood pulp.
Pulp Sales Corp., *Scanstates,* Kotka, 222 bls. sulphite, 37 tons; 840 bls. sulphate, 140 tons.
Whitaker Paper Co., *Scanstates,* Kotka, 110 rolls newsprint.
F. H. Shallus, *Scanstates,* Kotka, 97 rolls newsprint.
Wilkinson Bros., & Co., Inc., *Scanstates,* Kotka, 120 rolls newsprint.
Price & Pierce, Ltd., *Bockenheim,* ——, 2,700 bls. unbleached sulphite.
Price & Pierce, Ltd., *Heddernheim,* ——, 2,040 bls. unbleached sulphite; 840 bls. unbleached mechanical pulp.
Gottesman & Co., Inc., *Bockenheim,* Sweden, 3,000 bls. wood pulp.
Gottesman & Co., Inc., *Blankaholm,* Sweden, 3,550 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING DECEMBER 31, 1938

Lagerloef Trading Co., *Scanstates,* Kotka, 3,810 bls. mechanically ground pulp, 762 tons.
Pulp Sales Corp., *Scanstates,* Kotka, 5,000 bls. sulphate, 1,000 tons.
W. M. Stone & Co., *Scanstates,* Kotka, 36 rolls newsprint.
Old Dominion Paper Co., Inc., *Scanstates,* Kotka, 113 bls., 111 rolls newsprint.
Castle & Overton, Inc., *Scanstates,* Kotka, 1,128 bls. wood pulp, 225 tons.
Pulp Sales Corp., *Scanstates,* Helsingfors, 260 bls. mechanically ground pulp, 52 tons.
Price & Pierce, Ltd., *Heddernheim,* ——, 7,800 bls. unbleached sulphite.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, January 4, 1939.

All primary markets have been seasonally quiet under the influence of the Christmas and New Year Holidays. Reports from manufacturers' representatives, jobbers, and general paper merchants, reflect this normal slackening of trade as business houses are about to take the customary annual inventory. A moderate degree of confidence in a gradual improvement in demand for many grades of paper apparently prevails in the wholesale paper trade, as in many other major industries and markets. This optimism seems justified by the large and growing demand for a wide variety of paper and paper specialties. A favorable factor for the immediate expansion of sales volume, is the low level of current prices which provide inadequate profit for manufacturers. In view of increasing production costs which are inevitable under the fiscal and administrative policies now in effect, it is reasonable to expect any considerable increase in consumer demand is likely to result in an upward trend in prices.

The index of general business activity declined from 93.6 per cent for the preceding week, to 91.6 per cent for the week ended December 24, compared to 84.6 per cent for the corresponding period last year. Production of paper for the week ended December 24 of over 165 mills was 77.6 per cent, compared to 48.4 per cent for the corresponding week last year. Paper board production for a like period was 69.0 per cent, compared to 48.0 per cent last year.

The demand for newsprint continues to gradually improve and this important division of the paper industry is optimistic of the future. Prices remain firm with no expectation in the trade of any change from current quotations.

Demand for most grades of paper declined slightly during the holiday period but, on the whole, sales volume kept up well considering the slackening in general business activity. No important change in demand or prices has occurred during the current week.

Mechanical Pulp

The demand for mechanical pulp continues relatively light. Prices remain firm and unchanged at prevailing market quotations.

Chemical Pulp

No important change in demand or prices have been reported in any of the standard grades of chemical pulp for this week. Business is on the level of the past two weeks with prices holding relatively firm. No definite indication of a trend in prices has been reported this week and the current market situation continues unchanged at this date.

Old Rope and Bagging

Little demand for old rope is reported for the current week. Prices are unchanged at practically nominal quotations. Little business is reported in old bagging and this market is quiet, with quotations unchanged.

Rags

The demand for paper-making rags continues light. Prices remain unchanged on all grades of new and old domestic rags. Roofing rags continue steady. The foreign rag market is inactive and quotations continue nominal.

Old Waste Paper

No change in prices or demand has been reported in old waste paper for the current week. Prices remain relatively firm at low levels and conform to prevailing quotations.

Twine

Demand for practically all grades of hard and soft fiber twines is off a little for the week. Prices remain firm and no change in prevailing quotations are reported or expected in the trade, which is moderately optimisitic as to future business prospects.

Plan for Paper Exhibit

The National Paper Trade Association has again announced the exhibit of wrapping papers, paper products and kindred lines that has become an established feature of its conventions. Manufacturers and converters have received an invitation to participate, accompanied by a prospectus presenting all necessary details.

The exhibit will be held during the association's thirty-sixth annual convention at the Waldorf-Astoria, New York City, and the entire ninth floor of the hotel has been reserved for the purpose. Applications for space should reach the association office, 220 East 42nd street, New York, not later than January 20. On that date assignments will be made as heretofore by drawing lots for choice of space preferred.

The success of these exhibits and the number of those participating has increased with each renewal and the affair is now looked forward to by manufacturers and converters as the best opportunity for displaying their lines and introducing new items to the merchant trade. The educational advantages of the exhibit alone are more than sufficient to attract a complete representation of merchants to New York during Paper Week, irrespective of the important work and invaluable information developed at the convention sessions.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, January 4, 1939.

ALUM (Activated)—Quotations on activated alum are firm and unchanged at prevailing prices. The commercial grades are quoted at $.90 per 100 pounds, in 100 pound multi-wall bags, car lots, f.o.b., works.

BLANC FIXE—Prices of blanc fixe continue firm and conform to prevailing market quotations. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Quotations on bleaching powder continue firm and unchanged. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported fair for the week. Standard domestic casein, 20-30 mesh, is quoted at 9 cents per pound; 80-100 mesh, at 10 cents per pound. All prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda remain unchanged at prevailing market prices. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices of china clay continue steady at prevailing market quotations. Imported clay is quoted at from $14.50 to $25 per ton, ship side. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines.

CHLORINE—Quotations on chlorine continue unchanged at prevailing market levels. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported fair for this week. "G" gum rosin is quoted at $4.35; "F" wood rosin at $4.25 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is quoted at $2.56 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake continue firm and unchanged. Prices range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash continue unchanged at prevailing market levels. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—Prices of corn starch continue firm at prevailing market quotations. Globe pearl is quoted at $2.60 per 100 pounds, in bags. Special paper starch is offered at $2.70 per 100 pounds, in bags. All prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina continue firm and conform to prevailing market prices. The commercial grades are quoted at $1.15; iron free at $1.30 per 100 pounds, in barrels, car lot quantities, f.o.b., works.

SULPHUR—Prices of sulphur continue unchanged at prevailing market quotations. Annual contracts are quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Quotations on talc remain unchanged at prevailing market prices. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is offered at from $25 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	27.50	@	30.00
Chip	27.50	@	30.00
Sgl. Mla. Lt. Chip	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	42.50	@	45.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	@ 36.50	32.20	@ 37.75
85% Rag	.....		29.90	@ 35.00
75% Rag	23.60	@ 27.75	24.75	@ 29.00
65% Rag	.....		21.65	@ 26.25
50% Rag	17.55	@ 21.50	18.70	@ 22.75
25% Rag	14.65	@ 17.75	15.80	@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.60	@ $10.50	$9.75	@ $12.00
No. 2	7.70	@ 9.50	8.90	@ 10.75
No. 3	6.85	@ 8.25	8.00	@ 9.75
No. 4	6.45	@ 7.75	7.60	@ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.58
No. 2 Glossy Coated	9.25	@	10.75
No. 3 Glossy Coated	8.15	@	9.50
No. 4 Glossy Coated	7.65	@	9.00
No. 1 Antique (watermarked)	7.65	@	9.00
No. 2 Offset	7.00	@	8.25
A Grade E. F.	6.80	@	8.00
A Grade S. & S. C.	7.05	@	8.25
B Grade E. F.	6.25	@	7.50
B Grade S. & S. C.	6.50	@	7.75
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	28.00
Dry	25.00	@	28.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.25	@	2.75
Prime Qualities—			
Easy-Bleaching Sulphite	1.90	@	2.10
Strong Unbleached Sulphite	1.80	@	2.00
(On Dock, Atlantic Ports)			
Kraft Bleached	2.25	@	2.75
Kraft Light & Strong	1.60	@	1.75
Kraft No. 1	1.45	@	1.65
Kraft No. 2	1.40	@	1.45
(F. o. b. Pulp Mill)			
Kraft Domestic	1.25	@	1.75
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.00	@	7.25
Silesias No. 1	4.00	@	4.25
New Unbleached	6.75	@	7.00
Blue Overall	5.00	@	5.25
Fancy	2.10	@	2.25
Washables	1.60	@	1.70
Mixed Khaki Cuttings	3.25	@	3.75
O. D. Khaki Cuttings	4.00		4.25

Old Rags

White, No. 1—			
Repacked	3.15	@	3.40
Miscellaneous	2.60	@	2.75
White, No. 2—			
Repacked	1.90	@	2.10
Miscellaneous	1.50	@	1.60
Thirds and Blues—			
Repacked	1.40	@	1.50
Miscellaneous	1.25	@	1.30
Roofing Rags—			
No. 1	1.15	@	1.20
No. 2	.90	@	1.00
No. 3 (bagging)	.85	@	.90
No. 4	.65	@	.70
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

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Monkvarnd, Sweden
HERNÖÖ CELLULOSA A.-B.
Sprängviken, Sweden

Bleached Sulphite
KELLNER-PARTINGTON PAPER PULP CO., LTD.
Sarpsborg, Norway
Edsvalla, Sweden
Hallein & Villach, Austria

Unbleached Sulphite
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Orkanger, Norway
BERGVIK OCH ALA NYA AKTIEBOLAG
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No. 4 White Linens	2.25	@	3.25
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	3.00
No. 4 White Cotton	1.90	@	2.20
Extra Light Prints	2.00	@	2.40
Ord. Light Prints	1.75	@	2.15
Med. Light Prints	1.55	@	1.95
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.00	@	—
Checks and Blues	2.00	@	—
Linsey Garments	1.90	@	2.00
Dark Cottons	1.50	@	1.60
Old Shopperies	1.30	@	1.45
New Shopperies	1.45	@	1.50
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.40	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light	1.80	@	1.90
Wool Tares, heavy	1.90	@	2.00
Bright Bagging	1.70	@	1.80
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.50	@	2.75
Jute Threads	2.75	@	3.00
Sisal Strings	1.50	@	1.60
Mixed Strings	.60	@	.70

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.40	@	2.50
Ordinary Hard White No. 1	1.90	@	2.00
Soft White No. 1	1.75	@	1.80
Soft White Extra	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag	.70	@	.75
Solid Flat Book	.60	@	.65
Crumbled No. 1	.40	@	.45
Ledger Stock White	1.15	@	1.25
Ledger Stock Colored	.65	@	.70
New B. B. Chips	.15	@	.20
Manila—			
New Env. Cut	1.40	@	1.50
New Cuttings	1.25	@	1.35
Old Kraft Machine—			
Compressed bales	.65	@	.75
News—			
No. 1 White News	1.14	@	1.30
Strictly Overissue	.50	@	.55
Strictly Folded	.30	@	.35
No. 1 Mixed Paper	.15	@	.20

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.12¾	@	.14½
White Hemp	.13¾	@	.15¼
Fine Polished—			
Fine India	.16	@	.18
Unpolished—			
Box	.09½	@	—
Paper Makers	.09½	@	.10½
Tube Rope	.10¼	@	.12½
Wall Paper	.10¼	@	.12½
Wrapping	—	@	—
Soft Fiber Rope	.12	@	.14
Cotton	.17	@	.20
(Hard Fiber)			
Medium Java	.11	@	.17
Mex. Sisal	.10	@	.16
Manila	.18	@	.25
Domestic	2.65	@	2.75
Sisal Rope	1.60	@	1.65
Mixed Rope	.40	@	.50
Transmission Rope	1.90	@	2.00
Soft Jute Rope	1.80	@	2.00
Jute Carpet Threads	.75	@	.90
Gunny Bagging—			
Foreign	2.00	@	—
Domestic	1.65	@	1.75
Bleachery Burlap	3.00	@	3.25
Scrap Burlap—			
Foreign	1.60	@	—
Domestic	1.40	@	1.55
Scrap Sisal	1.25	@	1.50
Scrap Sisal for Shredding	1.65	@	1.85
Wool Tares, Heavy	1.60	@	1.65
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches	2.75	@	3.00
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging	1.00	@	1.15
No. 2 Bagging	.55	@	.75

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03¼	@	.03½
New White No. 1	.06¾	@	.07
New Light Flannelettes	.04¼	@	.04¾
Silesias No. 1	.04½	@	.04¾
New Black Silesias	.03¾	@	.04
Soft Unbleached	6.50	@	7.00
Blue Cheviots	.05	@	.05½
Fancy	.03	@	.03¾
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls	.04¼	@	.05
New Black, soft	.03¾	@	.04
Khaki Cuttings	.03	@	.03½
O. D. Khaki	.04	@	.04½
Corduroy	.02¾	@	.03
New Canvas	.06¾	@	.07¼
B.V.D. Cuttings	—	@	.06½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Old Blue Overalls	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.00	@	1.10
No. 2	.75	@	.85
No. 3	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.05	@	1.10
Dutch Blues	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias	4.75	@	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.06	@	.06¼
New White, No. 2	.03½	@	.04
Light Silesias	.03½	@	.04
Silesias, No. 1	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached	.05½	@	.06
Washable, No. 1	.01½	@	.01¾
Blue Overall	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2	.01	@	.01¼
New Blue	.01	@	.01¼
Fancy Percales	—	@	.02½
New Black Soft	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.	.03	@	.03½
No. 2 Mixed	.02	@	.02½
Corduroy	—	@	.02
New Canvas	.05	@	.05½
New Black Mixed	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1	—	@	.95
Domestic No. 1	—	@	.95
Domestic No. 2	—	@	.85
Roofing Bagging	—	@	.60

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope	—	@	3.50
Sisal Rope	1.50	@	1.75
Mixed Rope	.75	@	1.00
Scrap—			
No. 1	—	@	1.75
No. 2	1.00	@	1.25
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.75	@	1.80
No. 2 Soft White	1.30	@	1.40
No. 1 Mixed	.65	@	.75
Solid Ledger Stock	1.45	@	1.50
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy	.60	@	.75
Manila Cuttings	1.45	@	1.50
Print Manila	.40	@	.45
Container Manila	.35	@	.40
Kraft Paper	.75	@	.80
No. 1 Mixed Paper	.20	@	.25
Straw Board Chip	.25	@	.30
Binders Board Chip	.25	@	.30
Corrugated Board	.50	@	.55
Overissue News	.40	@	.45
Old Newspapers	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.55	@	.65
Manila Env. Cuttings	1.85	@	2.00
Manila Envelope Cuttings, extra quality	2.00	@	2.10
No. 1 Old Manila	.80	@	.90
White Blank News	1.30	@	1.40
No. 1 Kraft	.90	@	—
Mixed Papers	.15	@	—
Print Manila	.45	@	.55
Container Manilas	.27½	@	—
Old Newspapers	.25	@	.32½
Paper Wool Strings	.50	@	.65
Overissue News	.45	@	.50
Box Board Chips	.20	@	.25
Corrugated Boxes	.25	@	.30
Kraft corrugated boxes	.60	@	.65
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.80	@	1.90
No. 1 Hard White	1.70	@	1.80
No. 1 Soft White	1.50	@	—
Ledger & Writings	.75	@	.80
Solid Books	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts	1.10	@	—
Manila Env. Cuts	Nominal		
Ex. No. 1 Manila	Nominal		
Print Manila	Nominal		
Overissue News	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1	1.00	@	1.05
No. 2	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White	$35.50	@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod	17.00	@	—
Direct mill shipment in three-ton lots			
No. 5 White	$10.50	@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod	10.00	@	—
Book—			
No. 1 M. F.	$7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.25	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.75	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1	$12.00	@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.85	@	5.25
White Wrap	4.00	@	—
"B" Manila	4.90	@	6.15
No. 1 Manila	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)	46.00	@	—
Sheets	54.00	@	—

Pulp

Ground wood	29.00	@	—
Unbleached Sulphite	49.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.25	@	—
Soft White	2.15	@	—
White Blk. News	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut	1.35	@	—
Printed Manilas	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue	.50	@	—
Strictly Folded	.45	@	—
No. 1 Mixed Paper	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¼	@	.02½